THE BUILDER

INCORPORATING

"ARCHITECTURE" and "THE BRITISH ARCHITECT"

VOL. CLXXV DECEMBER 10, 1948 No. 5521

THIS WEEK'S NEWS

PAGE

HOLLAND HOUSE, Kensington, has been mentioned as a suitable headquarters for leading scientific societies. The M.o.W., we learn, are negotiating for its acquisition. 674

AN ARCHITECTURAL competition for designs for a shop front and interior has been won by Messrs. Bronek Katz and R. Vaughan, whose design is illustrated. 676

A FURTHER scheme of 64 flats in four blocks has been added to Greenwich B.C.'s Cherry Orchard Estate at Charlton. The scheme, which is described and illustrated, was carried out in under 10 months. 680

A DETAILED address on the use of load-bearing reinforced concrete walls in the construction of multi-storey domestic buildings was given by Mr. A. E. Seddon, M.Sc., A.M.I.Struct.E., of the Building Research Station, Garston, before a recent meeting of the Reinforced Concrete Association. 686

SPEAKING at a luncheon of the Federation of Associations of Specialists and Sub-contractors, Mr. Charles W. Key, M.P., Minister of Works, said that consideration would be given to raising the "free" building limits when the matter came up for review. 691

THE FUTURE OF PRIVATE ARCHITECTURAL PRACTICE

THE Council of the Royal Institute of British Architects having recently set up a committee to consider the present and future of private architectural practice, it would be improper for us to forestall its deliberations. It will be appropriate, however, to make some comment to clear the air of any misunderstandings in the minds of architects in general which might prejudice the good work which lies before the new committee.

It has always been the policy of the Institute to watch the interests of all its members, whether they are in private practice or are official or salaried architects; for the main care of this great body is to promote fine architecture, to which all other considerations are subservient. Fine architecture can be produced only by men who work under tolerable conditions, and are thus undistracted by the fear of penury, and it is in this sense only that the Institute becomes concerned with the material conditions of service which its members suffer or enjoy, as the case may be. The flavour of the old Craft Guilds—with their deep pride in, and concern for, a high standard of craftsmanship—is more closely apparent in the spirit of the Institute than the modern trade union doctrine which has become too much obsessed with the factor of materialism.

It would be foolish to claim that the interests of the private architect and that of the official architect are always identical in a material sense, and from time to time there is bound to arise the occasion where an apparent clash of interest appears. In the past the good feeling which prevails between these two classes of architect has been far less cordial than it is to-day, and it is gratifying to know that good sense and high principle have prevailed to create a fine sense of unity within the ranks of the Institute.

Past history cannot be entirely ignored, however, and the utmost watchfulness must be preserved lest the slightest crack appear in the united structure, for a neglected settlement can lead to the collapse of all sides of a building. We have no doubt in our minds that this new committee has been established in the right spirit, and it is only to those who may misread the signs that we venture to voice a warning. This is not the institution of two separately organised sides within the profession, each becoming ripe for a separate existence. It is an exploration undertaken in the interests of the entire profession, in the same sense that the Salaried Architects' Committee long ago was instituted.

We are confident that those salaried architects who are content to contemplate life in an entirely socialised country, with every detail in its pattern subject to official treatment and administered by the State, are in a very small minority, however much they may believe their own departmental work to be to the good of the country. That being so, it is essential that the structure of private enterprise, in the limited form which most of us hope to see preserved, shall be balanced in all its parts, including those parts of the professions which are designed to serve the individual. The individual who may live only in a State house, trade only in State shops and worship only in State churches, is in peril of losing his individuality, and he will not contemplate such a future if he is the typical Englishman to whom the world owes so much, and much of it so recently.

The state of private architectural practice thus becomes not so much a matter of saving the finances of the men so engaged as that of preserving a key factor in the new pattern of life which lies before us, and it is as important to the Whitehall junior draughtsman as to the most eminent practitioner of to-day.

It will have been noted that the terms of reference for this committee include the present as well as the future, for a very important part of the problem to be explored is immediate and urgent. At the moment, the bulk of new building is for State or municipal clients or employers, and the amount of private work in progress is relatively small, by the inevitable pressure of the rule of "First things first." Though these conditions may persist for some time to come, it is evident that they are by nature of a temporary character, and that the balance of State and private enterprise must sooner or later be restored. That is the essence of the immediate problem, and it becomes a matter of survival. There is a real danger that within this period of adjustment and with no intent of committing the country to an entirely socialised state, private enterprise may become stifled to death, and that when the normal returns it will be crippled by the unbalance so created.

The other danger is equally a matter of concern both to the private architect and the official architect. That is the risk of building up a civil service of architects adequate to meet the present abnormal programme of public works, much of which will become redundant within a few years, and subject to the mighty blows of the axe. Such conditions would create a demoralising state of affairs within the service itself, and would lead to many hardships within its ranks, and at the same time add to the burden of taxation under which all sections of the community already suffer.

It thus seems to us that the main work of the committee will revolve around the adjustment of this present abnormal and temporary phase, and that the energies of both kinds of practice must be applied to the problem, to the great advantage of both. We can see nothing but good emanating from closer contact between the private architect and the official department, and we see no grounds for suspicion on either hand if this closing up of the ranks of architects takes place with the highest motives towards the good of architecture.

That this is the spirit of approach on the part of the committee we have no doubt whatever. That it is fully understood within the general ranks of members we are not quite so sure, and it is for this reason we have thought it appropriate to venture into the subject while it is still *sub judice*. Nothing can preserve this country but an abiding faith in its future as a field for the British

way of life, and it is with that faith firmly grasped that we commend to the architect of to-day a clear-minded picture of its future in the good days which lie ahead.

HOLIDAYS WITH PAY

THE letters which have appeared recently in our correspondence columns on the Holidays with Pay Scheme suggest that the Management Company, which was set up to operate the scheme, is having a difficult time both in administering and in explaining it.

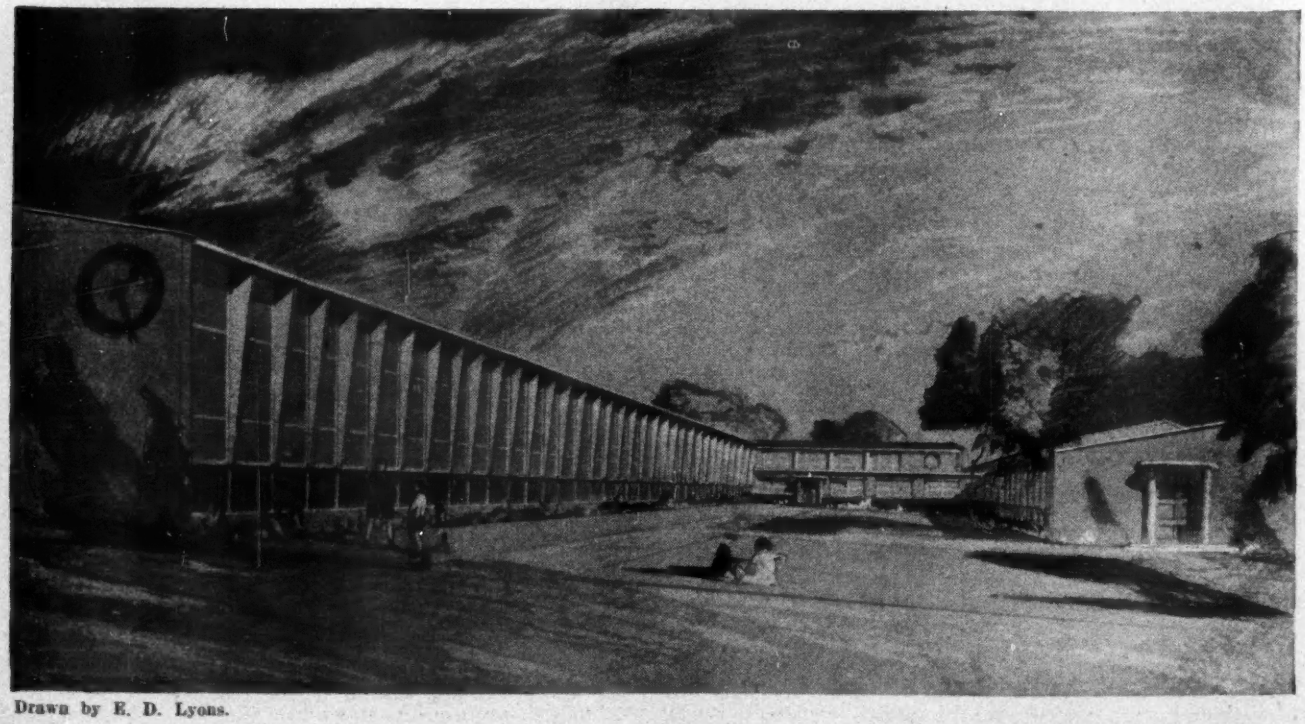
The scheme was made necessary by the highly casual nature of employment in the building and civil engineering industries. When an operative may work for as many as half a dozen different employers in the course of a year, it cannot be expected that the particular employer for whom he was working at holiday time should bear the burden of providing him with a paid holiday. Hence the present scheme, which provides that every building and civil engineering operative shall be entitled to an annual holidays credit card, which the employer is to stamp in respect of the whole or part of each week during which the operative is employed. The contribution is made entirely by the employer, so that the scheme really constitutes a form of accrued wage payment. When the operative takes his holiday—which must be between April and December—the particular employer at the moment will pay the total amount of credits as shown on the card up to the previous March 31, less a sum in respect of administrative costs. If an employee leaves the industry, he can claim payment of his holiday credits, as accrued up to the previous March, by applying to the Management Company between October 31 and December 31.

A similar scheme is operated by the Management Company to provide for the payment of operatives in respect of statutory holidays.

This scheme is probably the best that can be devised to deal with the very difficult problem of providing paid holidays in the building and civil engineering industries, and much credit is due to the leaders on both sides for formulating and securing the adoption of this joint industrial effort. Many of the difficulties that have arisen are clearly due to the sheer size of the building and civil engineering industries. There are to-day about 1,300,000 operatives, each of whom has one annual holidays card and four public holidays cards in the course of a year. This means that every year the Management Company has to deal with well over 6,000,000 cards. It is not surprising, therefore, that the Company has been confronted with difficulties of staff and accommodation, or that it is not always possible to deal with claims and correspondence immediately. It is possible that these difficulties might be mitigated if the scheme could be operated on the basis of smaller units. The Management Board might do well to consider the establishment of regional offices instead of running the whole scheme from London.

Granted, however, that this is the most satisfactory scheme that can be devised and that decentralisation can do little more than mitigate the difficulties, there remains the question whether enough has been done to explain the scheme to those whom it benefits—namely, the operatives. In all these schemes for the benefit of workmen it should be a paramount consideration that the scheme should not only be fair, reasonable and well administered, but that it should also be readily understood by the beneficiaries. There will, undoubtedly, be a considerable number of operatives who, like our correspondent, will consider it a grievance that on leaving the industry they can only apply for payment between October 31 and December 31, and then only in respect of the credits accrued up to the previous March. Others may be aggrieved that the payment of ordinary holiday credits in any year is on the basis of the stamps affixed in the twelve months up to the previous March. A moment's reflection ought, no doubt, to remind them that this is, after all, comparable with conditions elsewhere, since it is often the rule that the employee must serve for a certain number of months before becoming entitled to a holiday with or without pay. But the fact is that many people do not so reflect, and it should be the object of industrial leadership to remove the sources of misunderstanding and friction. The Management Company have issued some very useful leaflets for the guidance of both employers and operatives, but these would be even better if they explained the reasons for the rules laid down therein. A good deal could be done, and no doubt is done in many cases, by local trade union officers and by supervisory staffs, to explain matters to the men.

The first matter for consideration by the Company must clearly be its administrative problems. These dealt with, it is to be hoped that the Company will consider the importance of a sympathetic approach to those whom it exists to serve.



Drawn by E. D. Lyons.

AN ALUMINIUM SCHOOL FOR KENT.—Chislehurst and Sidcup Cray-road County Primary School. S. H. Loweth, F.S.A., F.R.I.B.A., Kent County Architect. *(See facing page.)*

NOTES AND NEWS

The Case of the Vanbrugh Drawings.

A PIECE of architectural detection that would have evoked a curt word of praise from Holmes himself is recorded by Mr. Laurence Whistler in the December issue of "The New English Review Magazine." The case opens with a visit by Mr. Whistler to the Victoria and Albert Museum to inspect "a collection of engravings and drawings, mostly by Thornhill," which were bought from a Mr. J. Smith in 1891 for the price of eleven guineas. "One glance at them was enough to excite the liveliest interest; for here, evidently, was nothing less (sic) unexpected than over forty original drawings out of Vanbrugh's or possibly Hawksmoor's office." Close examination of the drawings showed one to be of Kimbolton, another of King's Weston, another of Vanbrugh's house at Esher, and some of Eastbury. One, however, was of a project quite unrecorded. There was a plan of an old manor house, with the word "Court" on it and some writing that resembled Vanbrugh's. Then there was a drawing "entirely in the Vanbrugh manner, for bringing a measure of grandeur to the principal front of that house." On the back of this drawing was written in ink "Sr. Tho: Wheates Papers."

Mr. Whistler proceeds to relate how, by the careful construction of a chain of evidence derived from various sources, including the muniment room at Blenheim, he was led to Glympton, in Oxfordshire, from whose quarries, "whose overgrown mounds of debris are a feature of the park to this day," stone was taken to be used in the building of Blenheim Palace. Here, at Glympton, was undoubtedly the house, once the property of Sir Thomas Wheate, "created Baronet in 1696 and High Sheriff in the same year," for which the new elevation shown on the unidentified drawing was intended. The house was rebuilt in 1846, but "the width of the front is exactly that of Vanbrugh's when shorn of its projecting corner features."

The case, not without its points of interest, my dear Watson, turned entirely on those four words written on the back of the drawing. And the sequel? "The present owner is Mr. Alan Good. . . I told him about the Vanbrugh drawings," writes Mr. Whistler, "and he now entertains the idea of reshaping the garden-front (if conditions should ever be favourable) exactly as Vanbrugh conceived it. . . Consultations with his architect, Mr. Trenwith Wills, are continuing with that intention. Were it accomplished, there would be no other example in history, I think, of a design of a great architect being first abandoned and forgotten, then discovered, identified and carried out—on the site originally intended—and after an oblivion of nearly two centuries and a half."

Why was the Vanbrugh design for the new front never carried out? It is only possible to guess. The Blenheim archives show that the Glympton stone did not stand up to frost, and Sir Thomas Wheate may have abandoned his own private project for that reason. Alternatively, there is no record of Wheate ever receiving payment for the stone which he supplied to Blenheim, and he may well have said to Vanbrugh: "No payment, no work for you at Glympton." This question may never be answered. And now, my dear Watson, a little relaxation. I see that Yehudi Menuhin is playing at the Albert Hall.

A Five-week Competition.

THE architectural competition organised by Richard Shops for a shop-front in Regent-street, the winning design in which is illustrated in this issue, does something to parry the charge (referred to in a note on this page last week) that "architects are well known to be vague about time." This particular competition, a limited one, was carried through in five weeks from the day when the assessor, Mr. Maxwell Fry, received instructions to prepare conditions of competition, to the point where the six sets of designs were on public display in the Building Centre. Fair going, it will be conceded, and good news to other companies which would like to obtain competitive designs for premises yet, as in this case, are paying heavy rentals and cannot afford delay.

It would, of course, not be wise to push this parallel too far; such a result could not be obtained with designs for a complicated, large-scale building. But with a smaller project there would seem to be no reason why satisfactory results should not be achieved within a short period. It is to be noted that each of the six firms invited was awarded a prize of 50 guineas which must have gone much of the way to making the concentrated effort worth while.

Location is Everything.

WHAT an example is Mr. Winston Churchill to all men of one-track minds! His bricklaying propensities may be overstressed by a too-indulgent Press, and his painting may be praised beyond what he would claim for it, but his incursions into the wide field of the arts and crafts as a keen amateur call for our generous admiration. Now from his pen comes a good enthusiastic piece of writing in the shape of "Painting as a Pastime" (Odhams and Benn, 10s. 6d.). In it he sets forth his creed as an erstwhile painter. In general terms, this can be described as "having a go." Painting to Mr. Churchill is an enjoyable pastime; he is victim of no creative agonies, no painful periods of pre-activity; he sets up his easel and paints what he wants to paint in the bold colours so expressive of his personality. On the question of colour he is adamant. He likes them full-bodied and rich (he feels genuinely sorry for the poor browns!), thus proving himself no ardent disciple of Rembrandt. Being an amateur, Mr. Churchill has put himself into the enviable position of critic and soothsayer without undue fear of rebuttal.

Curiously enough, the statement regarding colour has a parallel in Mr. G. A. Jellicoe's recent seconding motion at the A.A. "Neutra" talk when, referring to contemporary A.A. architecture, he excused its lack of vernacular feeling on the grounds that it was really meant to find a home in the tropics; its light and shade qualities, he said, did not suit the English climate! Mr. Jellicoe is no amateur, and on this score he can hardly be excused for such a surprising statement. The art of the painter is fortunately untrammelled by the exacting conditions imposed upon architecture. We know well a café in London decorated internally in a supposedly South Sea manner—Gauguin murals and all—but there the painter's art had to end. Outside, the London soot has laid its patina upon an ordinary Edwardian façade. . . . Unless Mr. Jellicoe wishes the A.A. to develop rapidly into a School of Tropical Architecture, such misplaced activity must be ended.

No such territorial problems need trouble a painter; they certainly do not trouble Mr. Churchill, a full-blooded artist who most decidedly knows what he likes—and paints it.

Kensington Opposes L.C.C. Plan.

THE recent L.C.C. proposal to build blocks of low-priced flats in the pleasant Campden Hill area of Kensington has

AN ALUMINIUM SCHOOL FOR KENT COUNTY COUNCIL

AN aluminium school, one of the first in the country, will (as stated in our last issue) shortly be built at Sidcup, in Kent. This, the Chislehurst and Sidcup Cray-road County Primary School, will be the first of several in the county.

The contract will start in December of this year, when the builders will first erect portions which are of a permanent nature, prepare the foundations for the aluminium structure and carry out all the site works and underground services.

Initial aluminium parts of the building will be delivered to the school site in Cray-road, Sidcup, in April next in the form of prefabricated walls and roof units complete with windows, interior linings and ceilings ready for erection on foundation slabs. The units will include all internal partitions, doors and lockers, but not the external gable end walls, which will be made of local bricks. Erection of the aluminium units will be a matter of a few weeks only. Although the sections are to be prefabricated, the school will not be built to a standard pattern. The new system has allowed the designers considerable flexibility in planning a building which will have a "tailor-made" look. Insulation in the roof and all external aluminium walling of the building has been effected by the introduction of spun glass lagging to provide resistance against changes of external temperature. The buildings will be situated on a site at the northern end of Cray-road, which has a gentle slope to the south-east. The school will be close to the St. Paul's Cray Housing Estate, now being developed by the London County Council. The school will accommodate 240 juniors and 120 infants.

Aluminium will be used for five classrooms and a general purpose room which are to comprise one of the blocks, and for two classrooms with a general purpose room in a second block. Traditional brickwork, with metal windows, will be used for the assembly hall, canteen kitchen and dining hall, but even these portions of the premises will have aluminium roofs finished like those of the classrooms to ensure harmony of roof design throughout the buildings. Bright colours will be introduced both inside and outside the school. The whole of the prefabricated aluminium part of the structure is being supplied by the Bristol Aeroplane Co. (Housing) Ltd. Schools of similar aluminium construction are also to be erected at Maidstone, Folkestone, Erith and Dartford.

The scheme has been prepared in the Buildings Department of the Kent County Council, under the direction of the County Architect, Mr. S. H. Loweth, F.S.A., F.R.I.B.A., the Deputy County Architect, Mr. R. T. Green, F.R.I.B.A., and Mr. D. W. Dickenson, Dip.Arch. (Dunelm) A.R.I.B.A. The assistant architects engaged on the scheme are Mr. J. F. H. Checkley, L.R.I.B.A., Mr. H. Judson, A.R.I.B.A., and Mr. S. B. Wood, L.R.I.B.A. The quantity surveyors are Messrs. Dearle and Henderson. The heating, which is low pressure hot water, and the electrical installations have been designed by Messrs. Stinton Jones and Partners.

brought forth an angry protest from as far afield as Scotland. "The L.C.C. plan seems to have nothing to commend it but a handy scoring point for Labour," says one Aberdeen newspaper. Whatever the county council's motives may be, their proposals appear to conflict with the County of London Plan, which describes the area as one which "may be damaged by the injudicious zeal of the planner." There is little doubt that the Kensington borough council's decision to oppose the proposals will receive support from many Londoners who know this nine and a half acre site, which includes Moray Lodge, Thorpe Lodge, Cam House and Plane Tree House.

In the meantime, a number of residents of Campden Hill have united to form a preservation fund. A committee has been formed and Mr. W. G. Corfield, of Airlie Gardens, Kensington, is the chairman.

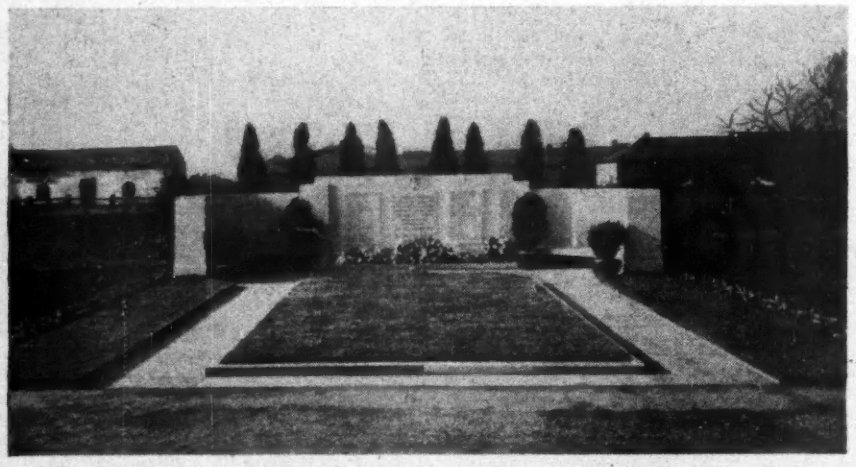
In defending its views the borough council points out that the houses at present on the sites proposed to be acquired still have useful functions to perform, for, although they may no longer be suitable for private residences, they are eminently suitable for educational establishments, hospitals, nursing homes and embassies, and could be adapted without affecting the schemes of private enterprise development already planned for the area.

Holland House.

It would appear that the Government seems to share the view of the borough council with regard to the future of some of the larger houses in the area. Mr. Herbert Morrison, speaking at the recent dinner of the Royal Society, disclosed that it was intended to acquire a site for a National Science Centre in London to house leading scientific societies, including the Royal Society.

Although no definite decision has yet been made, Holland House and its grounds, which adjoin the Campden Hill area, has been mentioned as being suitable for such a purpose. The Ministry of Works, we understand, are negotiating for the acquisition of Holland House Estate.

Described by Macaulay as "the resort of wits and beauties, of painters and poets, of scholars, philosophers and statesmen," Holland House would make an ideal headquarters for a National Science Centre, though the Royal Society would doubtless find it a wrench to leave its present home at Burlington House.



A MEMORIAL AT STRETFORD.—This Memorial to civilian air-raid victims has been laid out in the cemetery at Stretford, Lancashire. The Memorial was designed by Mr. A. H. Perry, A.M.Inst.C.E., M.I.Mun.E., Borough Engineer and Surveyor, and the work was carried out by Robert Carlyle and Co., Ltd.

A Jacobean Mansion.

Holland House, a red brick building with stone dressings, was built for Sir Walter Cope early in the seventeenth century, and an original plan (now in the Soane Museum) shows the side walls drawn in different ink from the main block and bears a note by John Thorpe that it was "perfected" by him. The central block was begun in 1605 and completed two years later. The side wings were designed and added soon after. Despite the numerous additions and alterations made during the eighteenth century and later, which have to a great extent destroyed the original character of the house, and damage caused by bombing during the war, it still remains a good example of the large type of Jacobean mansion. The main staircase, the Gilt Room, the White Parlour and the chimney-piece in the China Room have been described as being particularly noteworthy.

"Probe" on Jellied Eels?

The Ilford Council have ruled that the proposed erection of a stand for the sale of jellied eels on the corner of Station-road, Ilford, would constitute "development" under the Town and Country Planning Act, 1947, and that application for permission would be required.—*The Ilford Recorder.*

Professional Announcements.

Mr. L. C. Patterson, A.R.I.C.S., has commenced in private practice as a chartered quantity surveyor at 11, Cathedral-road, Cardiff (tel.: Cardiff 366, ext. 1), and will be pleased to receive trade catalogues.

Mr. G. K. White, F.R.I.C.S., of 27-28, Western Mail Chambers, St. Mary-street, Cardiff, has moved his London office to No. 2, Wandsworth-road, S.W.8 (tel.: Reliance 2116).

Deputy County Architect Appointed.

Mr. J. Ingoldsby, A.R.I.B.A., who has been on the borough architect's staff at Southampton since 1945, has been appointed deputy county architect to the Isle of Wight county council.

FROM "THE BUILDER" OF 1848

Saturday, December 9, 1848.

The state of Woolwich Marshes—A long communication, transmitted to the Board of Health by Mr. Rugg, of Woolwich, was laid before the court by Mr. Chadwick. It set forth that the whole drainage of Woolwich Marshes is very imperfect, and in many places they are without any drainage whatever. That the amount of sub-aquatic vegetation which was allowed year after year without removal, exhales a prodigious amount of miasmata, and the result was, that the whole district was scourged with attacks of ague and intermittent fever. It also stated that during the spring months of the present year the number of attacks from ague were upwards of 4,000, and several persons had four or five attacks, the average being two attacks, consequently there had been no less than 8,000 cases of ague amongst a population of 40,000 persons. So virulent had been the attacks, that the surgeon to the Odd Fellows' Lodge had during that period no less than 500 patients; and from 150 to 200 prisoners on board the *Justitia* convict hulk had been laid up at a time with the same disease, and nearly the whole of the workmen at the Royal Arsenal. . . . From a report of a general court of the Metropolitan Commission of Sewers.

BRISTOL CASTLE

By J. G. NOPPEN, F.S.A.

THE recent discovery of some remains of Bristol's royal castle is of wide interest; for the fortress originally defended one of our leading mediæval ports. The earliest records of actual building work there belong to the reign of King Henry III; they are chiefly concerned with a new great gate, a massive structure, of which fragments are not unlikely to remain, and to be presently unearthed. There is reference to a previous job, on January 7, 1240, when the constable of St. Briavels was ordered to have 23,000 shingles made in the Forest of Dean; he was "to see that they were well cut and finished (*bene escapulatas et dolatas*) and to carry them to Bristol for the roofing of the king's hall in the castle there."[1] This was the final stage, and the hall was doubtless complete by the time we hear of the gate.

The Gate.

In 1243, various repairs were done to the barbican of the gate, and to its two drawbridges (*pontes turneiceos*);[2] but subsequent evidence shows that the gate itself was rebuilt. Early fortifications were doubtless inadequate to repel an up-to-date invader, and the main gate was the centre of the castle's outer line. This was probably why, on January 25, 1244, the bailiffs of Bristol were ordered "to let Hamo and William, clerks, keepers of the king's works at Bristol," have 50 marks out of the farm of the town to collect materials for work on the castle gate.[3] In the following July the bailiffs were required to provide a further £20, and, in September, the sheriff of Somerset had to send a like sum out of the issues of an eyre of his county.[4] £20 more was demanded from the bailiffs on November 28.[5] These sums would pay for building work that would cost several thousands of pounds to-day and they would not have been needed for anything less than the rebuilding of the gate.

Progress of Work.

The work seems to have gone forward apace; for, on February 6, 1245, the constable of St. Briavels was ordered to have suitable joists made in the Forest of St. Briavels, for the flooring of the turrets of the "great gate of Bristol Castle," and carry them to Ledeneye.[6] The fabric of the turrets was, apparently, well advanced. Some ten weeks later the constable was required to deliver £20 to the keepers of the works to finish one of the turrets. The money was to come from the amercements of the last eyre of pleas of the forest in Gloucestershire.[7]

Much remained to be done and, in June, the bailiffs of Bristol were commanded to hand over another 50 marks, out of the farm of the town, to the keepers of the works of the gate[8] and, in October, the sheriff of Hereford was called upon to carry the timber, which had been felled in Dean Forest for the works of the gate, to Bristol Castle without further delay.[9] The frequent assignment of funds and orders for the speedy delivery of materials point to an important work in which the king is very interested.

Timber by Water.

Work on the gate is again going ahead in the Spring of 1246. On May 8 the bailiffs are instructed to let the keepers of the works have 40 marks out of the farm of the town.[10] The turrets, it appears, are now awaiting their floors, and, on May 10, the constable of St. Briavels is ordered to carry to Bristol "the timber felled and worked in Dean Forest to make joists for the king's work at the castle."[11] More timber, carried by water, was brought to the works in July. The writ reads: "By the water of the Severn."[12] In the following September the bailiffs had to find a further 50 marks for the works of the gate "out of the farm, or tallage, of the town."[13]

Little work is recorded in 1247; but on June 28, 1248, the bailiffs were ordered to finance work on the tower (keep) of the castle, and to carry out other repairs where necessary. A lime-kiln was to be made, and the wardens of Kingswood were to deliver dead tree trunks and brushwood for it. The bailiffs would pay.[14]

Castle Bridge Falls.

In September the castle bridge came to grief, and the bailiffs were ordered by writ "to repair the great bridge of Bristol Castle, which has just fallen down, out of the issues of the town,[15] and, in the same month, a letter close was issued requiring them to find the money for the keepers of the works to finish the castle gate.[16] Work was still in progress on the outward bridge and barbican in May, 1250,[17] and it seems, from what follows, that a shortage of funds had caused some delay. On November 10, 1250, the sheriff of Gloucester was ordered to go in person to Bristol to view the king's works there, which had been entrusted to four men. The sheriff was also to investigate and collect the arrears of the town's farm and arrange that they be spent by the said four men on the works. When that money was gone, he should provide further sums from the issues of the county.[18] Payment for both materials and wages were often in arrears, and sometimes led to a stoppage of work.

The Cost of the Gate.

The gate seems now to have been finished, as, on December 20, 1250, £213 was allocated to the bailiffs in respect of it.[19] This means that that sum would be allowed to them by the barons of the Exchequer when they came to account for the farm of their town, and it was, presumably, the final settlement. The total would include the specific sums, ranging from £20 to 50 marks (£33 6s. 8d.), together with moneys authorised by other writs which did not limit the amount to be spent. The accounts would be guaranteed "by view and testimony of lawful men": in the latter case these would testify to the reasonableness of what it had been found necessary to spend; in the former to the rightful use of the sum authorised.

The Viewers.

The viewers were sometimes named in the writ; but usually they were reputable townsmen appointed by the bailiff, or sheriff. Their job was not the oversight of the work, but of the accounts. Their names rarely appear; but, in April, 1251, John le Giller and William of Lichfield were viewers at Bristol and, as they were poor and infirm, the bailiff was ordered to appoint suitable men in their place.[20]

It is impossible to express the probable cost of the new gate in terms of our money. The amount of building work that Henry III could get done for £200 would have cost over 40 times as much before the war, and to-day costs are very much higher. Moreover, the £213 seems not to have included any expenditure on timber, which came from the royal forests, or for its carriage, which was arranged by the constable of St. Briavels and the sheriff. It is also unlikely that the sum included any purchases of stone. There is, however, no doubt that the gate was a massive structure.

The recent finds at Bristol serve to remind us that every mediæval town had its castle and that, in the thirteenth century, works of reconstruction were carried out at every one of them. Their nature was such that, though there may now be nothing left above ground, it is improbable that every fragment has been grubbed up and destroyed.

The replanning and rebuilding, now in progress, may lead to further interesting fragments being unearthed, and to important additions to our knowledge of them.

[1] Lib. Roll 25, Henry III, p. 18.
[2] L.R. 27, Henry III, p. 174.
[3] L.R. 28, Henry III, p. 212.
[4] Ibid, pp. 254 and 265.
[5] L.R. 29, Henry III, p. 280.
[6] L.R. 29, Henry III, p. 289.
[7] Ibid, p. 300.
[8] Ibid, p. 308.
[9] Ibid, p. 326.
[10] L.R. 30, Henry III, p. 50.
[11] Ibid, p. 51.
[12] Ibid, p. 66.
[13] Ibid, p. 81.
[14] L.R. 32, Henry III, p. 190.
[15] Ibid, p. 199.
[16] Close R. 32, Henry III, p. 88.
[17] L.R. 34, Henry III, p. 289.
[18] Close R. 35, Henry III, p. 376.
[19] L.R. 35, Henry III, p. 324.
[20] Close R. 35, Henry III, p. 432.

COMING EVENTS

Tuesday, December 14.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—"The Town and Country Planning Act, and the Work of the Central Land Board," by Sir Malcolm Trustram Eve, Bart., M.C., 66, Portland-place, W.1. 6 p.m.

ROYAL INSTITUTION OF CHARTERED SURVEYORS.—Quantity Surveyors' Annual Dinner, Savoy Hotel, Strand, W.C.2. 7 p.m.

THE INSTITUTION OF STRUCTURAL ENGINEERS.—"The Code of Practice for the Structural Use of Normal Reinforced Concrete in Buildings," by Dr. Oscar Faber, 11, Upper Belgrave-street, S.W.1. 6 p.m.

Wednesday, December 15.

THE INCORPORATED ASSOCIATION OF ARCHITECTS AND SURVEYORS (London and Home Counties Branch).—"Prestressed Concrete," by Mr. C. W. Glover, F.I.A.A. York Hall, Caxton Hall, Westminster, S.W.1. 6.30 p.m.

THE INSTITUTE OF WELDING.—Open discussion on Welding Methods. East Ham Technical College. 7.30 p.m.

ROYAL SOCIETY OF ARTS.—"Industrial Design and the Engineering Industries," by Mr. M. Hartland Thomas, M.A., F.R.I.B.A. John Adam-street, W.C.2. 2.30 p.m.

SOUTH EASTERN SOCIETY OF ARCHITECTS.—"The Work of the R.I.B.A.," by Mr. Richard Henniker, F.R.I.B.A. Guildhall, Kingston-on-Thames, Surrey. 7 p.m.

Thursday, December 16.

R.I.C.S.—Mr. Noel Dean on "Reconditioning of Agricultural Buildings." 12, Great George-street, S.W.1. 6 p.m.

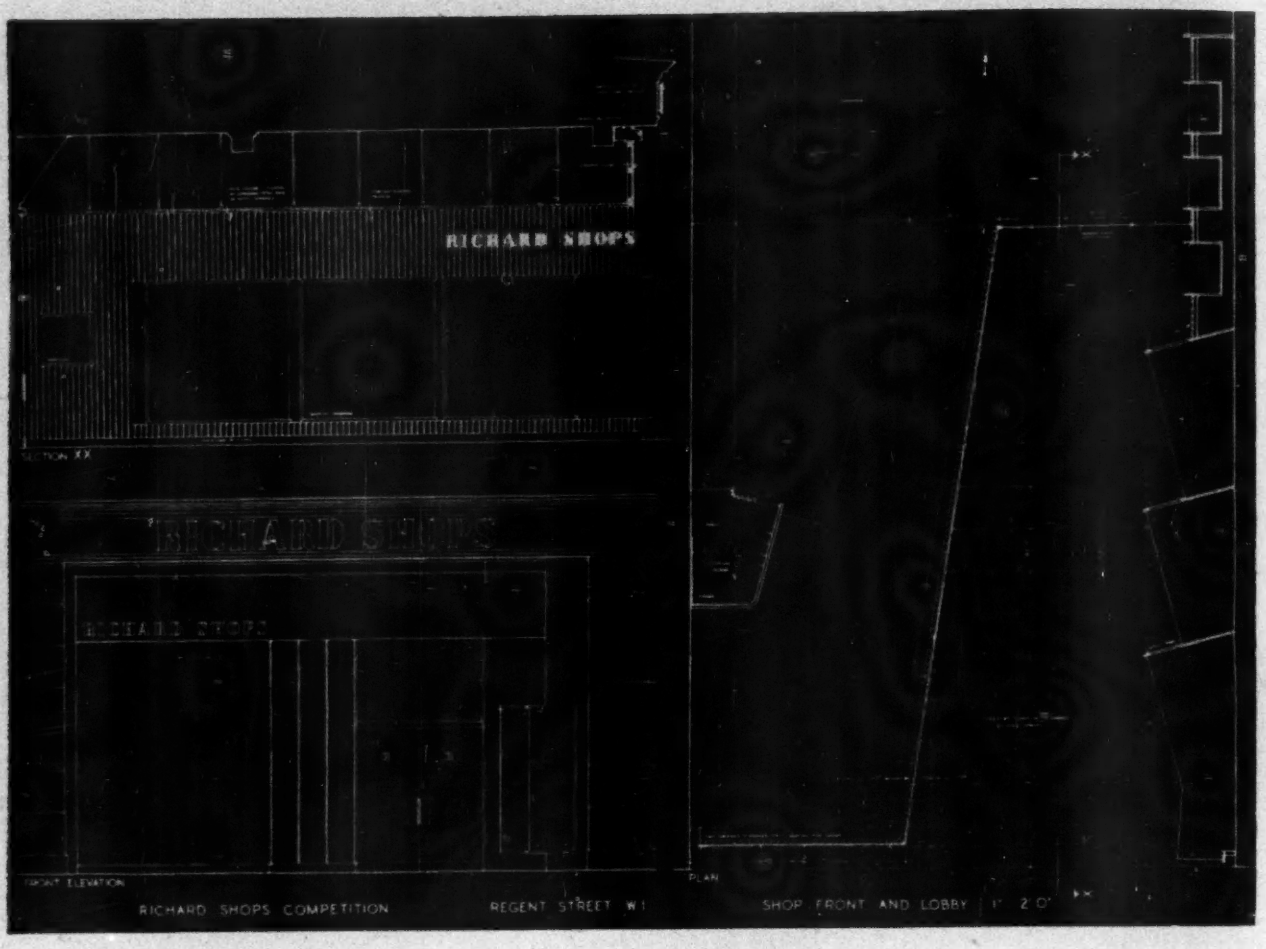
Friday, December 17.

R.I.C.S.—Junior Organisation's Annual Conference. 12, Great George-street, S.W.1. 10 a.m.

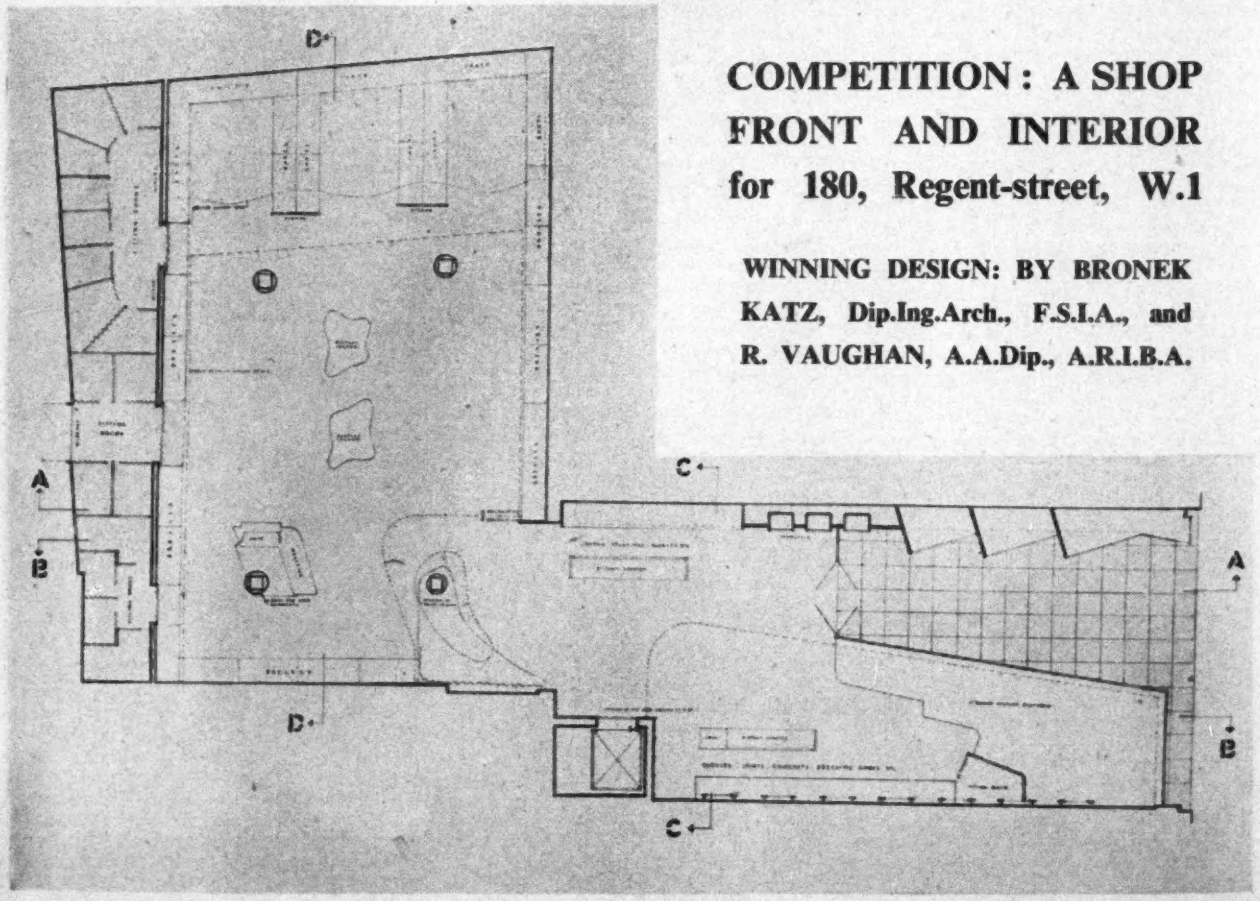
R.I.C.S.—Annual Dinner, Connaught Rooms, W.C.2. 7.30 p.m.

The A.A. Members' Rooms.

IN response to several requests, arrangements have now been made for the A.A. Members' Rooms bar at 36, Bedford-square to be open daily from 11.30 a.m. to 2.30 p.m., and it is hoped that members will take advantage of this service for themselves and their guests. The bar is also open in the evenings from 5 p.m.



Details. *Below*: **The plan.**



COMPETITION: A SHOP FRONT AND INTERIOR for 180, Regent-street, W.1

WINNING DESIGN: BY BRONEK KATZ, Dip.Ing.Arch., F.S.I.A., and R. VAUGHAN, A.A.Dip., A.R.I.B.A.

THE result of a limited competition for the design of a shop-front and interior at 180, Regent-street, London, W.1, for Messrs. J. S. R., Ltd. (Richard Shops) has been anounced. The assessor, Mr. E. Maxwell Fry, F.R.I.B.A., has made his award as follows:—

FIRST (Design No. 7): Bronek Katz, Dip.Ing.Arch., F.S.I.A., and R. Vaughan, A.A.Dip., A.R.I.B.A.

SECOND (Design No. 3): Brian Peake, A.A.Dip., A.R.I.B.A.

THIRD (Design No. 5): Messrs. George Fairweather and R. Furneaux Jordan, FF.R.I.B.A.

THE ASSESSOR'S REPORT

In his report, after giving his award, the assessor states:

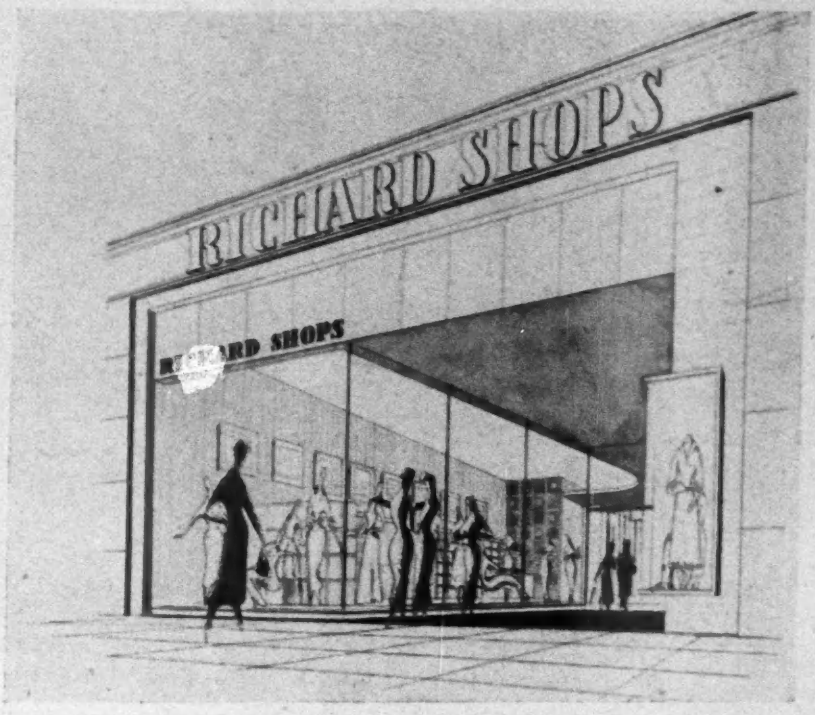
The remaining designs received were as follows:—(No. 1), Tom Braddock, F.R.I.B.A.; (No. 2), Michael H. Egan, A.A.Dip., A.R.I.B.A.; (No. 4), Neville Conder; (No. 6), D. Dex Harrison, Dip.Arch., A.M.T.P.I., A.R.I.B.A., and Ernest Seel.

Each competitor has been paid the sum of 50 gns.

The winning design fulfils most of the exacting conditions of the programme. The shop-front is contemporary in feeling, attractive without over-emphasis, and arrests attention by means of its display windows from whichever direction it is approached. The deeply recessed front invites entry, the display carries the eye inward and the swing doors offer the slightest impediment. Window and interior display are cleverly merged.

While the arrangement of the front sales area is good, with the cash desk well placed, there is a sufficient invitation into the main sales area in rear, with a well-placed spot display.

The arrangement of fitting rooms with existing partitions retained, is well planned and economical; the main sales area is free and unobstructed and excellent use is made of the large curved skylights across the end of the space. The lighting arrangements in conjunction with lowered ceilings, which differentiate the sales and display areas and join the front and back shops, are excellent. The character and decoration of the shop are simple and elegant and feminine.



Front to Regent-street.

The estimate appears to be reasonable and the drawings are in sufficient detail to enable working drawings to be rapidly completed for an early contract.

No. 3 has less display capacity in the shop window but good visibility into the sales area. The layout is straightforward but fails to take advantage of existing features, such as the curved skylight or the junction between the front and rear sales area where cash desks are placed instead of displays, or similar means of inducing customers to penetrate the interior. Fitting rooms are too grouped in relation to selling area. The general character of the interior and the shop-front is charming, but the competitor had just failed to integrate the various elements, including ceilings and lighting, as an effective selling instrument.

No. 5 has a good front window display and fair visibility inwards. The layout of rear sales is quite good with a possible array of fitting rooms. The main suspended ceiling appears rather heavy and the chief feature display, which takes up sales area, is too long in building up from front to rear. The shop front is unimpressive and no means of lighting the island showcase is shown. The drawings are a trifle uncommunicative.

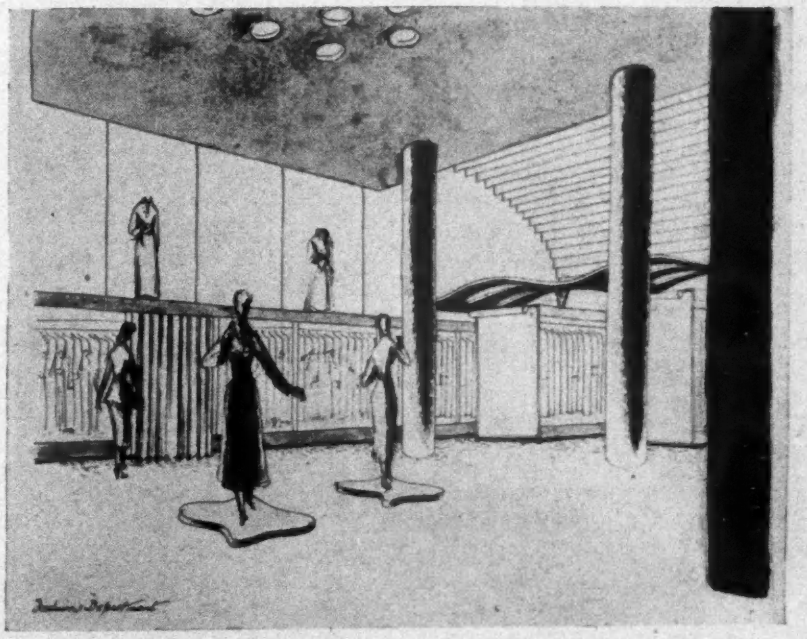
Description of Project.

Following is a summary of a description of the project which accompanied the general conditions of the competition:—

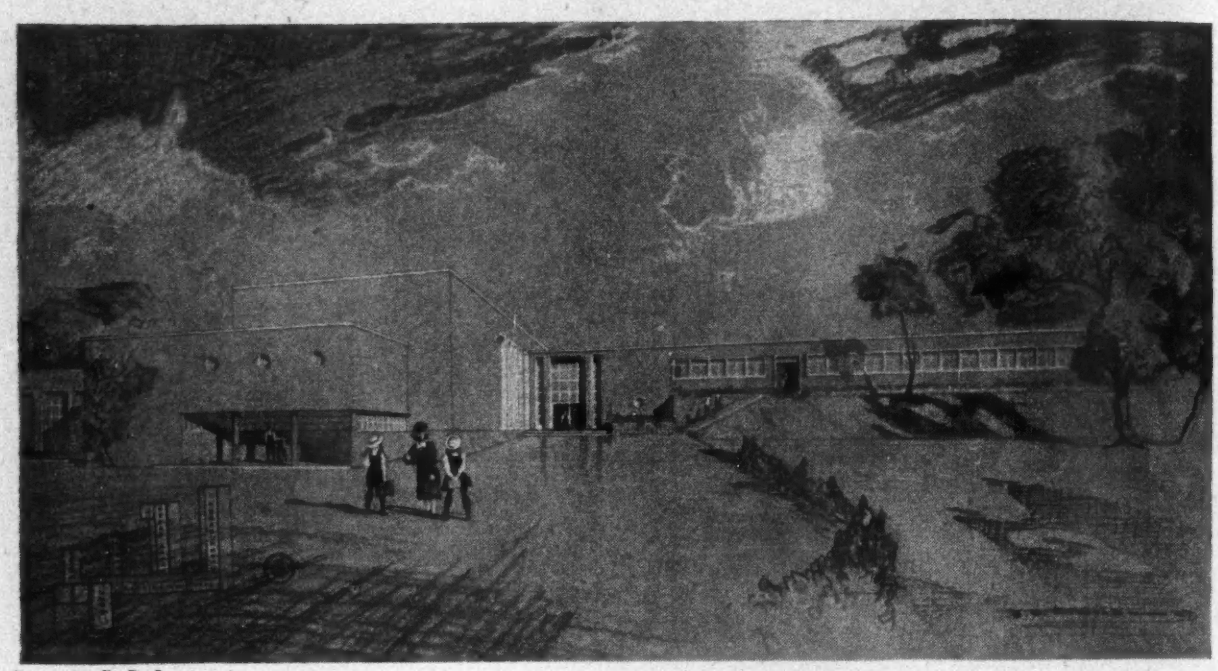
The design must provide for a wide lobby with island show-case, if possible, before the actual entrance to the shop, and while providing a full and particularised display of the range of garments in stock in these windows, make entry to the sales area an easy and inviting matter. While this display in depth is important, a frontal display to Regent-street must be borne in mind. The promoters have decided to include the interior sales area of the shop within the scope of this competition, but the character of the interior of their existing shops is to be maintained in the main, and standard hanging fixtures, the dimensions of which are 5 ft. wide, 6 ft. 6 in. high, and 2 ft. deep, must be used.

The sales area will have a cash desk and simple means of keeping bags and wrapping paper for immediate use, but no office. Particular attention should be paid to lighting, not only to general lighting, but the lighting of merchandise.

The title RICHARD SHOPS, in cut-out letters designed by Mr. Ashley Havinden in a stencil type, must be used as a distinguishing mark of the business on the shop-front and wherever elsewhere employed. A sunblind must be incorporated in the shop-front design.



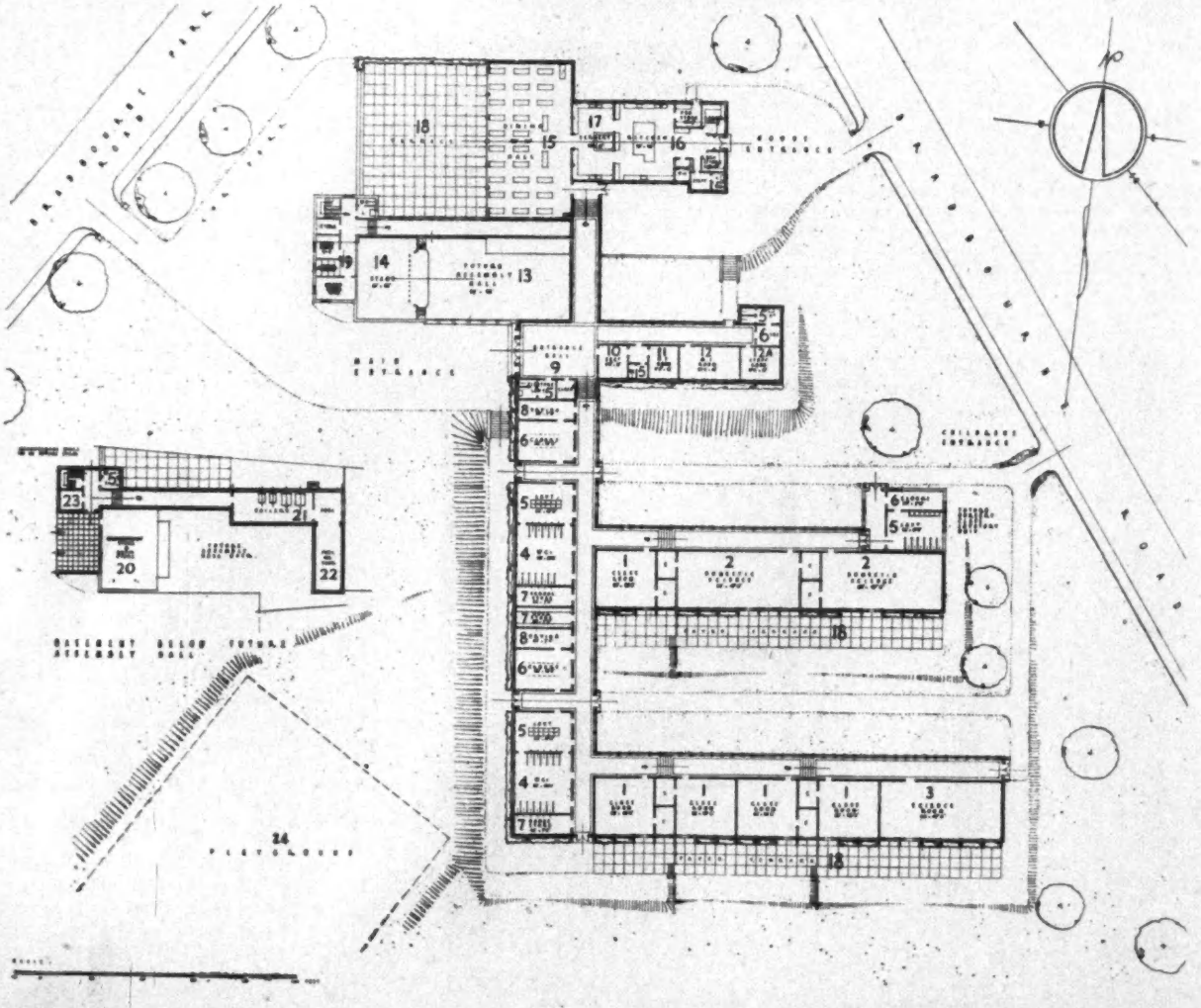
Sketch design for fashion department.

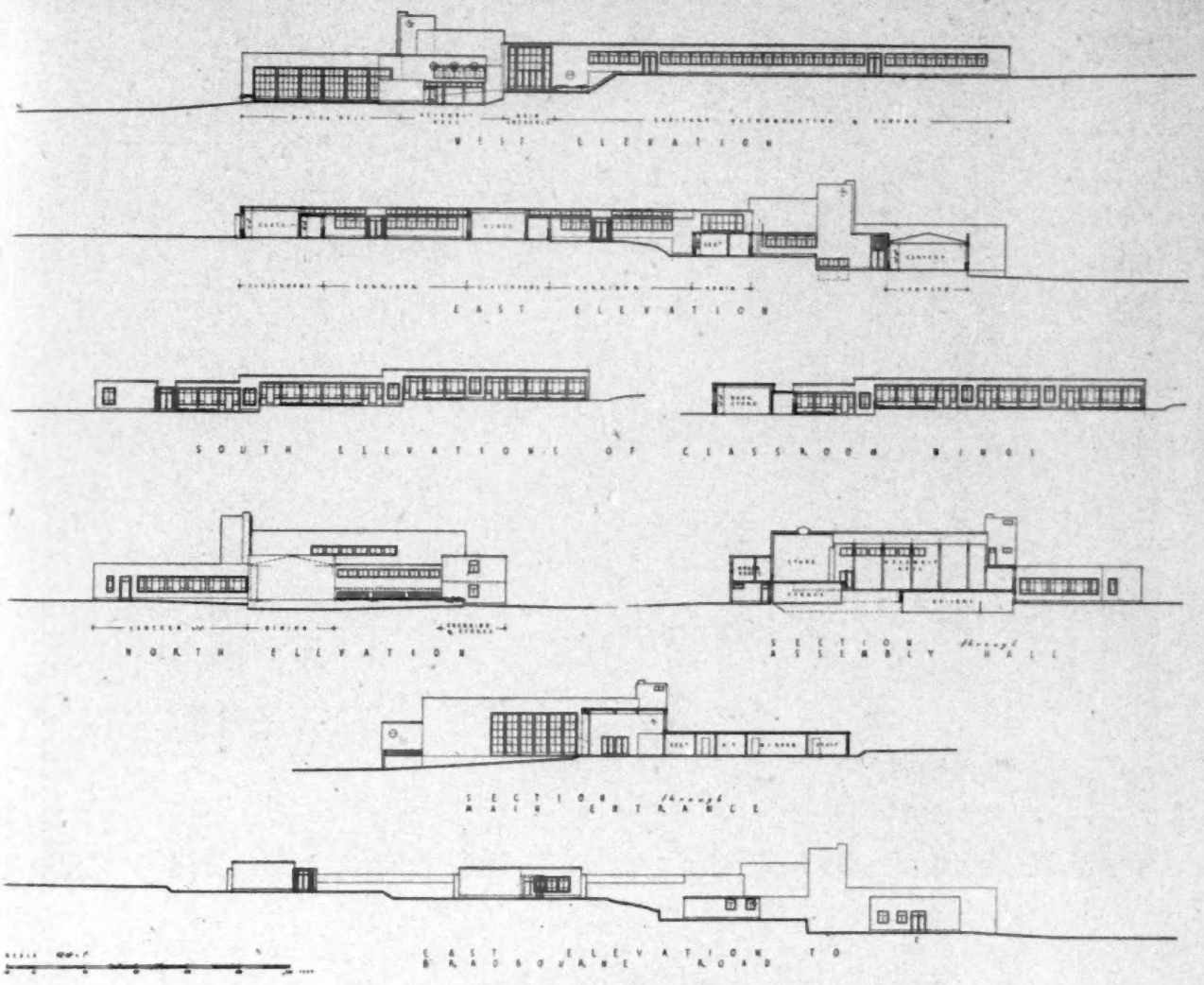


Drawn by E. D. Lyons.

SEVENOAKS (HATTON) LADY BOSWELL'S COUNTY PRIMARY SCHOOL

CABLE AND PITE, F. and A.R.I.B.A., ARCHITECTS,
in collaboration with S. H. LOWETH, F.S.A., F.R.I.B.A., KENT COUNTY ARCHITECT





The elevations and sections.

THIS new Primary School is being erected at Sevenoaks under the Operational Progress of the Kent Education Committee. The School will occupy a corner site having a principal frontage to Bradbourne Park-road and a secondary access from Bradbourne-road, Sevenoaks.

The site consists of fourteen acres, and contains the large residence known as "Hatton." The house is being adapted for use by the Education authority but is not part of the present scheme.

The site is partly wooded but for the greater part consists of pleasant open meadows sloping slightly to the north. It is situated near the built-up area of St. John's and is approached by secondary roads so that very few pupils will have to cross busy traffic routes to get to school.

The new school buildings, together with additional accommodation provided at "Hatton," will be used temporarily as a County Secondary School for about 360 girls between the ages of 11 and 15. This temporary requirement has necessitated careful arrangement of class and practical rooms to allow easy conversion to the requirements of the final programme, which is the provision of a single stream Primary School for 190 Juniors and Infants with a primary class attached.

As in the case of other schools in Kent the building is being erected in stages, the first comprising 5 classrooms, 3 practical rooms, the usual sanitary accommodation and an administrative wing. The second will consist of Canteen, Dining Hall, Kitchen, etc., and the Assembly Hall will be erected last. It is hoped, if circumstances permit, to combine stages 1 and 2, and to complete stage 1 this year.

Accommodation is to be provided throughout on one floor, the classrooms having a south-easterly aspect, with sanitary accommodation located on the main north-south axis with direct access to the playing area. The buildings conform to the natural contours of the site and this will add to the interest of the composition of the whole.

The Assembly Hall and principal entrance are approached from Bradbourne Park-road, whereas the pupils' entrances are so arranged as to provide access from both the former and Bradbourne-road. This arrangement will enable the Hall to be used independently of the school.

The external walls and principal partition walls will be of brick, and the flat roof will consist of "Bitumetal" aluminium roof decking carried on steel principal and secondary joists. The whole building has been designed to a unit of 8 feet 3 inches.

The architects are Messrs. Cable and Pite, F. and A.R.I.B.A., in collaboration with Mr. S. H. Loweth, F.S.A., F.R.I.B.A., Kent County Architect. Messrs. Stinton Jones and Partners will be the consulting engineers for heating, hot water, and electrical services.

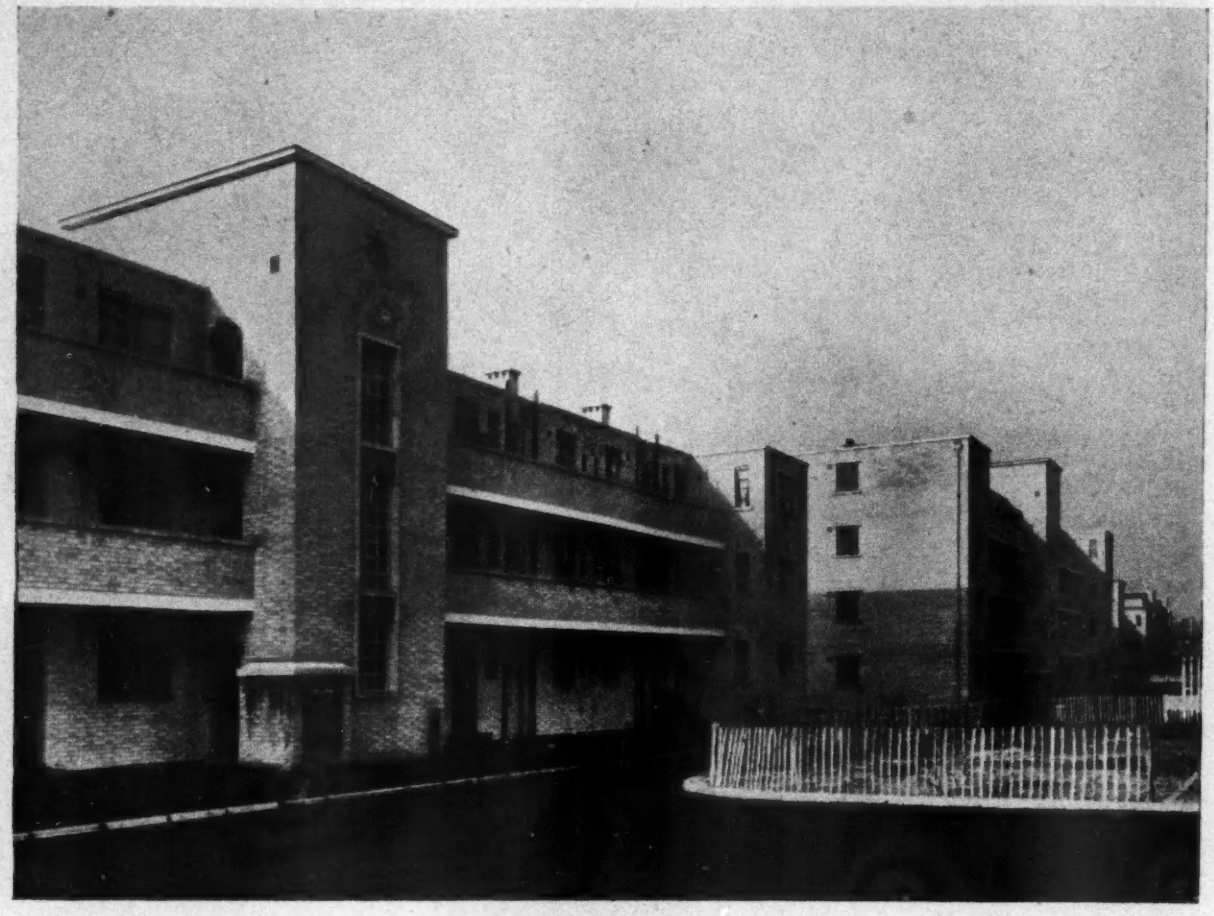
Messrs. D. R. Nolans, F.R.I.C.S., are the quantity surveyors.

The general contractor is Mr. S. B. Berwick, of Sevenoaks.

The steelwork is being carried out by Messrs. Redpath Brown, Ltd.

SEVENOAKS (HATTON) LADY BOSWELL'S COUNTY PRIMARY SCHOOL

CABLE AND PITE, F. and A.R.I.B.A., ARCHITECTS,
in collaboration with
S. H. LOWETH, F.S.A., F.R.I.B.A., KENT COUNTY ARCHITECT



The East elevation.

HOUSING AT CHARLTON

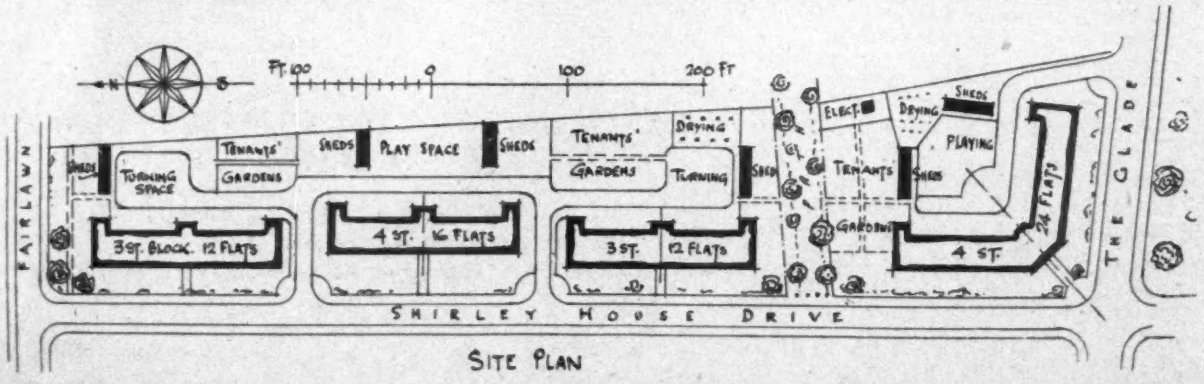
ADDITION TO CHERRY ORCHARD ESTATE FOR GREENWICH B.C.

C. H. JENNINGS, M.Eng.(L'pool), M.Inst.C.E., BOROUGH ENGINEER AND SURVEYOR
C. W. CRASKE, M.M., A.R.I.B.A., CHIEF ARCHITECTURAL ASSISTANT
G. H. SAYCE, A.R.I.B.A., ASSISTANT IN CHARGE OF WORK

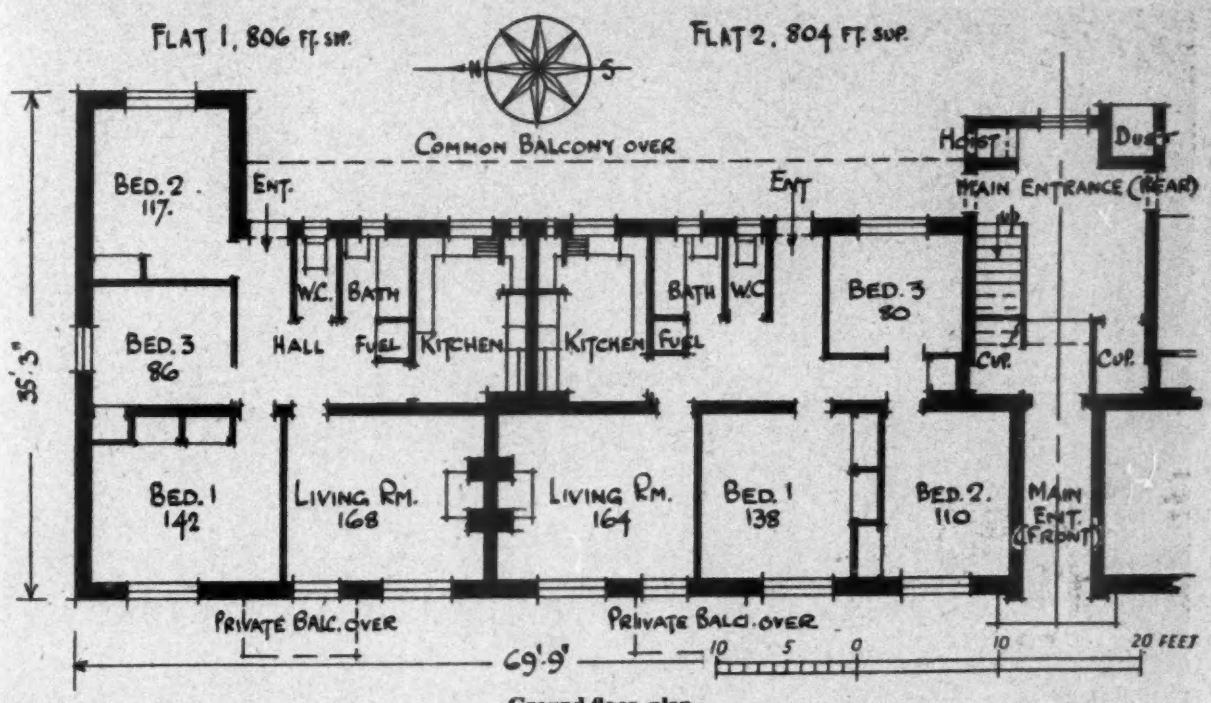
THE plans and photographs reproduced in these pages show a further development on the Cherry Orchard Estate, Charlton. The first instalment of flats was described and illustrated in *The Builder* of October 3, 1947, and consisted of 112 flats in the Charlton-road frontage. The scheme just completed comprises 64 flats in four blocks, facing an inner road (Shirley House-drive) and planned in two blocks of three storeys, and two of four.

The tender was negotiated, and the contractors already on the site, Messrs. Gee, Walker and Slater, Ltd., submitted a price of £108,526, which was approved. A start was made on January 9, 1948, and the blocks were handed over at regular intervals from July 26 to October 31, the contract having been carried out in under ten months—a notable achievement.

ACCOMMODATION: Each flat contains a living room and three bedrooms, of areas shown on the plan. The kitchen is approximately 11 ft. by 8 ft.; bath and w.c. are separate.



SITE PLAN



Ground-floor plan.

Access is by common balcony, but each flat has a small private balcony facing the road and approached directly from the living room. External ranges of pram and cycle sheds provide one for each family, and the site, though small, also gives a certain amount of enclosed space for tenants' gardens, for outdoor clothes drying, and playground space for the tenants' children.

MATERIALS: As in the first instalment of flats, the facing bricks are Uxbridge No. 6 (buff), and windows and doors have cast stone dressings. Floors and flat roofs are of reinforced concrete, laid *in situ* by Caxton Floors, Ltd. The floors are surfaced with "Semastic" tiles, laid by Horsley, Smith, Ltd., and the asphalt roof covering was laid by Excel Asphalte Co., Ltd. Staircase handrails and other metal work were made by S. W. Farmer, Ltd., of Lewisham.

EQUIPMENT: *Heating and Hot Water.* Each living room is provided with a "Camelon" solid fuel burning stove, with adjustable fire cover for lowering at night. No

The West elevations to Shirley House-drive.

HOUSING AT CHARLTON. View of angle block.

back boiler is included, hot water being supplied by means of "Ascot" multi-point heaters in the kitchens. Two bedrooms have built-in electric fires.

COOKING AND WASHING: Three blocks are provided with gas appliances; the fourth block (24 flats) has electrical equivalents.

OTHER ITEMS: Each kitchen is equipped with ventilated food cupboard, dresser, shelving and folding ironing board; and near each common staircase a hopper is available for the collection of refuse in a dust chamber. A hand-operated goods hoist is also provided, to obviate the difficulty of getting fuel and other heavy material taken above ground-floor level.

The first flat was inspected on June 24 last by their Royal Highnesses Princess Elizabeth and the Duke of Edinburgh, on the occasion of their visit to Greenwich.

The scheme has been carried out for the Greenwich Borough Council under the direction of Mr. C. H. Jennings, M.Eng. (L'pool), M.Inst. C.E., Borough Engineer and Surveyor. He was assisted by Mr. C. W. Craske, M.M., A.R.I.B.A., Chief Architectural Assistant, and Mr. G. H. Sayce, A.R.I.B.A., who prepared the plans and had general charge of the work. The bills of quantities were prepared by Mr. G. F. K. White, F.R.I.C.S.

The agent on the site for Messrs. Gee, Walker and Slater, Ltd., was Mr. L. Leslie, and the Council's Clerk of Works was Mr. F. Burness.

BOOK REVIEW

ARCHITECTURAL PRACTICE AND PROCEDURE. By H. Hamilton Turner (Fourth Edition). Pp. xiv, 414. (B. T. Batsford, Ltd.) 18s. net.

This well-known and popular book now appears in its fourth edition. It is based upon lectures originally delivered at the Architectural Association in 1921, and it first appeared in 1924. It still retains many characteristics of those lectures in its friendly informality, its discursiveness, and its frequent allusions to personal experiences in practice. Its author is a quantity-surveyor, not an architect, but that is not altogether a disadvantage as it enables architectural readers to see themselves as others see them. The new edition differs from the third (1945) edition only by the inclusion of a new chapter of 24 pages on "War Damage Repairs" and three new appendices, viz.: "Form of Proof for Evidence" (for use in cases of dilapidations); "Form of List of Market Prices" (under the R.I.B.A. Contract, 1939); and "Form of Specification for making good War Damage in a Small House."

The volume has now become very lengthy as a result of three revisions, and could be compressed with advantage when a fifth edition is called for. Readable as it is, much of the information is given in somewhat verbose terms and would benefit by drastic pruning throughout. The description of the use of "letter-books" (pp. 18-23), though sensible enough when it was written, is now completely obsolete, as indeed the author admits on p. 23. It will only confuse a beginner as it stands. There are other survivals, but more serious are the omissions of all reference to many matters that harass the practising architect to-day.

For example, the index contains no mention of "priorities," building licences, British Standard Specifications (though on p. 256 there is a brief reference to their existence), or of the Town Planning Acts and the Restriction of Ribbon Development Act, with all the extra work that they entail for the architect. The R.I.B.A. Form of Contract, 1939, is explained in detail but no notice is taken of the new requirements in clause 25 (A) that were added in the 1945 edition. These modern additions to the architect's worries may be temporary, but they are very much in evidence to-day. M. S. B.

BOOKS RECEIVED

BUILT-IN FURNITURE IN GREAT BRITAIN. By Frederick Gibberd. (London: Alec Tiranti, Ltd.) Price 6s.

BUILDING SUPERVISION. By W. R. M. Pippard. (London: E. and F. N. Spon, Ltd.) Price 8s. 6d.

THE MODERN FLAT. By F. R. S. Yorke and Frederick Gibberd. (London: The Architectural Press.) Price 35s.

MODELLED ARCHITECTURE. By P. R. Wickham. (London: Percival Marshall and Co.) Price 12s. 6d.

ROOF CARPENTRY. Second Edition. By T. H. Rawlinson. (Surrey: The Technical Press, Ltd.) Price 6s.

THEORY OF STRUCTURES. By Arthur Morley, O.B.E., D.Sc. (London: Longmans Green and Co.) Price 21s.

GARDENS IN THE MODERN LANDSCAPE. By Christopher Tunnard. (London: The Architectural Press.) Price 18s. 6d.

BUILDING SCIENCE. Edited by D. Dex Harrison. (London: George Allen and Unwin, Ltd.) Price 21s.

CORRESPONDENCE

Maisonettes in lieu of "Semi-detachment."

TO THE EDITOR OF *The Builder*.

SIR,—The masterly reconstruction of houses at Bath by Messrs. Mowbray Green and Partners (illustrated in your last issue) offers interesting suggestions for new urban development. Hitherto, most new urban development which has not taken the form of small detached or semi-detached houses has been by way of blocks of flats.

It is generally agreed that terrace houses, while having much to commend them from the architectural point of view, not to mention the economy in the construction of roads, are not very greatly in favour. However, there are many people who, while perhaps not desiring a flat (a residence entirely on one floor), would be interested in a modern, well-equipped maisonette. A block of maisonettes built as such could combine many of the advantages of houses with those of flats, particularly such services as heating, hot water and porterage.

Where private gardens are desired, these would not be difficult to provide, since maisonettes could be planned with entrance and gardens at ground-floor level and others without gardens above. The London County Council has included from time to time some of this type of development in its housing schemes, but residential development of the kind suggested has seldom been widely adopted in this country.

B. A. P. WINTON-LEWIS.

29, Manchester-street, W.1.

Sculpture in Britain.

TO THE EDITOR OF *The Builder*.

SIR,—May I use the hospitality of your newspaper to bring to the notice of architects the fact that there are many competent and talented sculptors in Britain waiting for the opportunity to produce work that would undoubtedly add a much needed grace and dignity to London and our provincial towns. Architects, in the main, hold the key to the future livelihood of these sculptors, who have been particularly hit by the war. However, quite apart from the sculptors' well-being, there is the barren aspect of London and other cities, compared with most European towns, which could be alleviated by the discerning use of sculpture either as part of buildings or free but part of the general schemes.

I noticed in your issue of November 26 an illustration of the first L.C.C. flats of post-war design. They look competent enough and are probably good machines to live in, but how much more quality they would have gained, and pleasure they would have given, by the judicious use of sculpture. I know the tenants are only too glad to have this accommodation, but why not attempt to stir civic pride? The cost is comparatively little and it is worth so much. The labour and materials are waiting and wasting.

I also noticed in the same issue that Mr. R. H. Mathew, Architect to the L.C.C., is preparing designs for the concert hall on the South Bank, and I am sure he will produce something we can be proud of; and I hope he will use sculpture liberally, as did other great architects of the past and present. I hope he has seen Stockholm Town Hall and Chartres Cathedral and been duly inspired. If any difficulty should ever be found in locating sculptors, I am sure the secretary of the Royal Society of British Sculptors, 6, Queen-square, W.C.1, would be helpful.

ERIC J. DOUDNEY.

Sewardstonebury, E.4.

Stained Glass at the Tate.

TO THE EDITOR OF *The Builder*.

SIR,—The illustrated note appearing in your paper on October 29 on the subject of the stained-glass window by Mr. Ervin Bossanyi at the Tate refers to this work as having been commissioned by the Trustees of the Gallery. This statement is incorrect.

The project was initiated as far back as 1937 by admirers of the artist, and a subscription was privately collected in its support. The preliminary designs were accepted by the Trustees in 1938 on the assumption that the window would be presented as a gift. During the war, when the work was already in an advanced state, the Trustees agreed to make a contribution in order to overcome certain difficulties which had arisen, among others the increased cost of materials.

JOHN ROTHENSTEIN,
Director and Keeper of the Tate Gallery.

London, S.W.1.

"The Brewery Lions."

TO THE EDITOR OF *The Builder*.

SIR,—Further to your correspondence on "The Brewery Lions," I have a personal recollection of a lion removed from this site, which may be of interest.

Fifteen or so years ago a fire occurred on the site and a firm of contractors by whom I was then employed were instructed to carry out demolition and clearance work. One of the objects salvaged was a large lion made, if I remember correctly, in silhouette of sheet metal. The contractor had this renovated and presented it to Messrs. Hoare and Co., of the Red Lion Brewery, St. Katherine's-way, who were clients of his.

E. T. BROWN.

1, Elmdene, Tolworth, Surrey.

Site Costing for Builders.

TO THE EDITOR OF *The Builder*.

SIR,—Costing is a term generally used to describe the preparation of different forms of expense analyses, e.g., technical estimates, comparative statements, records of expenditure and contract sums compiled to a laid-down formula.

The following notes must not be taken as related to the compilation of estimates for any purpose other than rate-fixing, or the routine recording of expenditure incurred on cost-plus contracts, e.g., R.O.D.I formula. Neither do they concern the routine accounting for total expenditure under the main cost elements in order to build up profit and loss statements.

The Ministry of Works booklet, "Site Costing for Builders (1948)," aims to satisfy the need for expense control *at the site*, where action can be taken if the management on the spot is aware of preventable losses.

The point of the notes is to examine whether, in fact, the system set out is good and desirable and in line with the industrial technique favoured by those advanced in methods of management.

The authors have linked Cost and Bonus Records—and rightly so. But it is easy to read in the booklet the propagation of cost-recording in itself as an aid to improved output. The experience of cost accountants in other industries has long since led to the abandonment of this doctrine. Cost recording as a means of preventing waste or stimulating productivity is useless.

The publication of this booklet in the year 1948 is regrettable. The tone is out-of-date. There are incorporated in the system some useful principles related to cost control, but the really important factors are under-stated or not mentioned and the importance of cost recording is grossly exaggerated.

Historical cost records, divorced from planning, progressing and incentive, are useless records. Linked with these important tools of management, cost records are an essential but subsidiary instrument. The Ministry of Works should stress planning, progressing and incentives, leaving in their true perspective the incidental records of cost which arise.

One wishes that the opportunity had been taken to issue a booklet on "Cost Control"—a scheme based on pre-determined targets—for by so doing the industry would have been placed abreast of the times.

Some of the essentials of "Cost Control for Builders" are incorporated in the Ministry of Works Scheme.

With regard to planning, the analysis and re-collection of the Bill items is an important preliminary. This gives a basis for task-setting and rate-fixing. It should be possible in many cases to state target *hours* for selected tasks and to make the task the basis for calculating bonus instead of resorting to the elaborate and expensive scheme of periodic measurement.

Targets should be set realistically to reflect current conditions and not by reference to some pre-war year or some retired craftsman. With good rate fixing it will take really hard work to earn more than 20 per cent. over the standard rate.

Whatever the proportion of sharing "time saved," the basic time should appear in the schedules. This basic should be a reasonable rate of output for a good average operative making all allowances for normal working conditions. The adjustment of basic time to target time will depend on the method of sharing between employer and operative. The desirable method is to allow all time saved to the operative, and under this condition the target would be a 20 per cent. relaxation of basic. If the employer participates in the time saved, a further relaxation would be necessary according to the desired proportions.

Any departure from "straight" bonus is undesirable because the resultant target is distorted according to the mathematics of the scheme and the target is less effective as a true measure of output. In "premium" bonus costs are higher than in "straight" bonus for output between basic and target.

All targets, bonuses and apportionments should be kept in terms of *time* right through the scheme until the extension of bonus hours at standard rate on the actual pay roll. Apart from the clerical effort saved by avoiding unnecessary calculations in sterling, the whole of the staff should be trained to think and act in terms of time. Time varies only with method. Sterling is not a good basis for long-term comparisons.

Probably the study and assessment of effort is the greatest problem involved. A methods-study man attached to the Estimating Department would be usefully employed in making detailed studies of selected operations in order to keep the rate fixers up-to-date.

With regard to progressing, an agent or general foreman would require, in addition to his wages clerks, some assistance

in the preparation of suitable programmes of work. At the present time it is difficult to envisage and pre-determine a job (other than housing) clearly enough to make one of the Ministry of Works' Progress Charts a practicable proposition. Nevertheless, a reasonable amount of preparation is vital and a trained Progress and Bonus Clerk would provide the assistance necessary to prepare the allocation of bonus tasks and keep the necessary records of actual time.

The value of planning is now felt because, apart from Bonus Time Records, there is no need for other cost recording for measured work. This is the point at which the scheme approaches most nearly to the widely adopted principle of standard costing. If special recording and reporting is necessary, it should be concentrated on two main causes of loss, i.e., (1) allowances over pre-determined target due to circumstances which might have been prevented; (2) unmeasured tasks (it often pays to target these difficult operations at generous rates).

If the management is efficient (the Ministry of Works' system has little to say about this) then any other labour cost arising on the site is almost unavoidable and all the records in the world won't save a penny.

Some reference to incentive methods has already been made. What remains to be said is that if a suitable and encouraging scheme of incentive is not employed, the value of planning and progressing is lost and records of performance will do no more than provide, at a cost, a story of what happened. It is by the dynamo of incentive that everything is made to work. Site Management is a problem which still remains to be solved, but it has been proved that the use of foremanship as a driving force for production leads to neglect of the technique of production. Relieved of the need to drive for output, a foreman can concentrate on the technical aspects of his work.

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The remainder of the afternoon session was devoted to a discussion on the subject "Short Courses to aid Part-Time Lecturers." Mr. Emms, who opened the discussion was concerned mainly to establish the need for such courses having regard to the difficulties of adapting courses to suit the ability of the average apprentice; he emphasised that teaching was required more than lecturing and that some training in teaching was therefore essential.

Housing Architect for Belfast.

A NEW POSITION, that of Housing Architect, is to be created by Belfast Corporation in connection with the city's large housing programme. Applications have been received from all parts of the United Kingdom, and a short list of four has been chosen—all from across the Channel. These are to be interviewed by the Housing Committee in the next week or two. Mr. R. S. Wilshere, F.R.I.B.A., the city's Education architect, who had been seconded to housing, is to revert to his own post, the Northern Ireland Government having refused to sanction his appointment as Education and Housing Architect.

The new Housing Architect's first job will be to draw up a scheme for flats which will probably be erected on some of the city's blitzed sites. In the past the city has been opposed on principle to a flats scheme, but the shortage of houses and especially of sites has forced the Corporation to modify their attitude

RESEARCH IN BUILDING

EXPERIMENTAL HOUSES

A series of experiments in the manufacture and erection of permanent houses by non-traditional methods are described in "New Methods of House Construction," published by H.M.S.O. on behalf of the Ministry of Works, price 1s. The houses were selected from schemes put forward by the industry and were built in groups of 50 to 250 in various parts of the country. As a condition of the contracts with the firms concerned the Ministry of Works had full facilities for observation of costs and man hours, both on sites and in factories. This information was collected in great detail in order that a valid comparison could be made between the new techniques and the traditional methods which they replaced. Positive conclusions were reached which some of the firms have been able to confirm by later experience.

The novelty of the methods examined in this report lies mainly in the construction of the walls. The basic principle involved is the use of factory-made house elements which are sufficiently accurate in dimensions to fit together on the site with a minimum of manipulation. It will be seen from the report that in the case of the better systems there are substantial savings in total labour requirements on site and in factories, with a possibility of some ultimate reduction in cost as compared with traditional methods of construction. It is true, however, that the labour and costs of the main shell of a house are only about a third of the total, and the savings made only apply to this third, so that the result on total cost and manpower requirement, although useful, is not revolutionary.

Further investigation is planned on the application of the same principles to the finishings of the buildings.

HOUSING PROGRESS

FIGURES FOR OCTOBER

The Housing Progress Reports presented to Parliament on October 31 as White Papers by the Minister of Health and the Secretary of State for Scotland, show that the number of permanent houses completed in Great Britain during October was 19,741, compared with 20,402 in September.

The number of permanent houses completed during the present year is now 189,300, made up as follows:—January, 15,272; February, 16,134; March, 20,357; April, 19,171; May, 20,372; June, 21,159; July, 19,838; August, 16,854; September, 20,402; October, 19,741.

The number of temporary houses finished in October was 494 (compared with 880 in September). Only 654 temporary houses remain to be completed out of the total programme of 157,270. The number of houses (permanent and temporary) completed in October was, therefore, 20,235, compared with 21,282 in September. The total number of houses completed is 544,118 (387,502 permanent and 156,616 temporary).

During October, homes were provided by new building, repair of uninhabitable houses, conversion and requisitioning for 22,719 families, compared with 24,448 in September and 21,035 in August. This brings the total number of families rehoused by these methods under the post-war programme to 821,434. Excluding requisitioned houses, the number of additional homes provided is 791,179.

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The morning session was devoted to a discussion on "The Significance of Apprenticeship in Building. Its relation to the Crafts and to Technical Occupations." Opening the discussion, Mr. F. E. Drury emphasised the need to revise the tendency to regard education as a means of escape from manual work and spoke of advantages which would accrue from a closer contact between industrial and educational worlds. Building teachers should, he said, appreciate the significance of apprenticeship as a means of producing the men needed to make the changes in technique necessary for development of the industry. He recommended planning courses for apprentices for their immediate purpose; a broad purpose was desirable and City and Guilds schemes were adequate to prepare for further advances in due course, but it was a mistake to try students too stiffly in the earlier stages. Finally, he touched on the extension of apprenticeship to technical occupations, in which connection he urged integration of school courses and industrial training.

The first part of the afternoon session was devoted to a business meeting at which a draft constitution for the Conference was discussed and adopted with some amendments. Mr. R. L. Roberts was elected President and Mr. F. E. Drury Vice-President for the inaugural year. Mr. A. Emms, of Gravesend Technical College, was elected hon. secretary, and Mr. D. W. Aldred, of S.W. Essex Technical College, hon. treasurer.

The remainder of the afternoon session was devoted to a discussion on the subject "Short Courses to aid Part-Time Lecturers." Mr. Emms, who opened the discussion was concerned mainly to establish the need for such courses having regard to the difficulties of adapting courses to suit the ability of the average apprentice; he emphasised that teaching was required more than lecturing and that some training in teaching was therefore essential.

Housing Architect for Belfast.

A NEW POSITION, that of Housing Architect, is to be created by Belfast Corporation in connection with the city's large housing programme. Applications have been received from all parts of the United Kingdom, and a short list of four has been chosen—all from across the Channel. These are to be interviewed by the Housing Committee in the next week or two. Mr. R. S. Wilshere, F.R.I.B.A., the city's Education architect, who had been seconded to housing, is to revert to his own post, the Northern Ireland Government having refused to sanction his appointment as Education and Housing Architect.

The new Housing Architect's first job will be to draw up a scheme for flats which will probably be erected on some of the city's blitzed sites. In the past the city has been opposed on principle to a flats scheme, but the shortage of houses and especially of sites has forced the Corporation to modify their attitude

RESEARCH IN BUILDING

EXPERIMENTAL HOUSES

A series of experiments in the manufacture and erection of permanent houses by non-traditional methods are described in "New Methods of House Construction," published by H.M.S.O. on behalf of the Ministry of Works, price 1s. The houses were selected from schemes put forward by the industry and were built in groups of 50 to 250 in various parts of the country. As a condition of the contracts with the firms concerned the Ministry of Works had full facilities for observation of costs and man hours, both on sites and in factories. This information was collected in great detail in order that a valid comparison could be made between the new techniques and the traditional methods which they replaced. Positive conclusions were reached which some of the firms have been able to confirm by later experience.

The novelty of the methods examined in this report lies mainly in the construction of the walls. The basic principle involved is the use of factory-made house elements which are sufficiently accurate in dimensions to fit together on the site with a minimum of manipulation. It will be seen from the report that in the case of the better systems there are substantial savings in total labour requirements on site and in factories, with a possibility of some ultimate reduction in cost as compared with traditional methods of construction. It is true, however, that the labour and costs of the main shell of a house are only about a third of the total, and the savings made only apply to this third, so that the result on total cost and manpower requirement, although useful, is not revolutionary.

Further investigation is planned on the application of the same principles to the finishings of the buildings.

HOUSING PROGRESS

FIGURES FOR OCTOBER

The Housing Progress Reports presented to Parliament on October 31 as White Papers by the Minister of Health and the Secretary of State for Scotland, show that the number of permanent houses completed in Great Britain during October was 19,741, compared with 20,402 in September.

The number of permanent houses completed during the present year is now 189,300, made up as follows:—January, 15,272; February, 16,134; March, 20,357; April, 19,171; May, 20,372; June, 21,159; July, 19,838; August, 16,854; September, 20,402; October, 19,741.

The number of temporary houses finished in October was 494 (compared with 880 in September). Only 654 temporary houses remain to be completed out of the total programme of 157,270. The number of houses (permanent and temporary) completed in October was, therefore, 20,235, compared with 21,282 in September. The total number of houses completed is 544,118 (387,502 permanent and 156,616 temporary).

During October, homes were provided by new building, repair of uninhabitable houses, conversion and requisitioning for 22,719 families, compared with 24,448 in September and 21,035 in August. This brings the total number of families rehoused by these methods under the post-war programme to 821,434. Excluding requisitioned houses, the number of additional homes provided is 791,179.

Load-Bearing Reinforced Concrete Walls

THEIR USE IN THE CONSTRUCTION OF MULTI-STOREY DOMESTIC BUILDINGS

THE use of load-bearing reinforced concrete walls in the construction of multi-storey domestic buildings was the subject of a paper* read by MR. A. E. SEDDON, M.Sc., A.M.I.Struct.E., before a meeting of the Reinforced Concrete Association on November 17. Following is a summary of his remarks:—The research programme in progress at the Building Research Station concerning thin load-bearing reinforced concrete walls arose from a need for information to enable these walls to be used in multi-storey domestic buildings with greater economy in the cost of construction. A programme of this kind can only be directed to provide information of rapid practical application on the basis of a comprehensive picture of the problem as a whole, i.e., not only from the standpoint of structural performance but also from the points of view of all functional and æsthetic requirements, constructional technique and workmanship. To that end it is desirable that the investigators responsible for the programme should make and maintain contact with all branches of the building profession and, by continuous discussion with them, formulate a background of opinion and practical experience on which their investigations may be based most satisfactorily.

In the usual type of multi-storey framed building the basic structural grid is a column-and-beam frame, to which is added an "in-filling" including the walls, floors and roof. At most, the floors and roof may be regarded as parts of the structural grid, but the walls are normally considered distinct from it. The latter are designed as non-load-bearing partitions except that the external walls are designed to resist wind loading within the panels formed by the columns and beams of the frame. On this basis the strength and stability of the walls assume secondary importance in general, and other functional requirements and æsthetic considerations are more important factors in wall design and in the choice of suitable materials. Thus, the materials chosen range from old-established materials, such as stone and brick, to those which have resulted from the intensive development of alternative materials of construction during recent years. The use of reinforced concrete as a wall material is usually limited to walls in which strength and stability have special significance in comparison with panel walls and partitions in general, for instance, to external panel walls and staircase walls.

There is at present, however, a type of construction in process of development in which load-bearing reinforced concrete walls are incorporated in multi-storey domestic buildings as part of the basic structural grid. In some cases these walls have been so arranged in plan that the necessity for columns and beams has been dispensed with. These walls and the floors divide the building into its major compartments, and further sub-division is obtained by non load-bearing panel walls and/or partitions. The nature of this form of construction has led to the use of such terms as "box-frame," "cellular" and "egg-box" construction to describe it. In other cases the same basic principle has been adopted but, for reasons of planning and architectural treatment, columns or columns and beams have been used also. An instance of this is illustrated in Fig. 1, which represents part of a housing scheme at present under construction in Finsbury, which is based primarily on a system of load-bearing cross walls at right angles to the length of the block, although columns are used in the first storey. These two variations of the basic principle of utilising load-bearing walls, and others, are included in the term "load-bearing reinforced concrete wall construction."

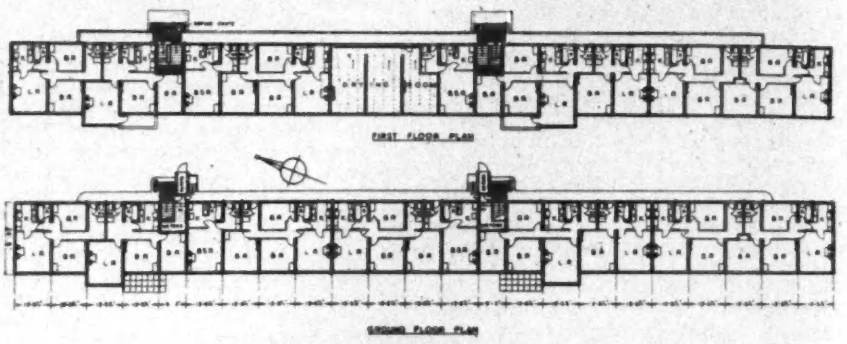

Fig. 2.—Flats at Minerva Estate, Bethnal Green. Floor plans.

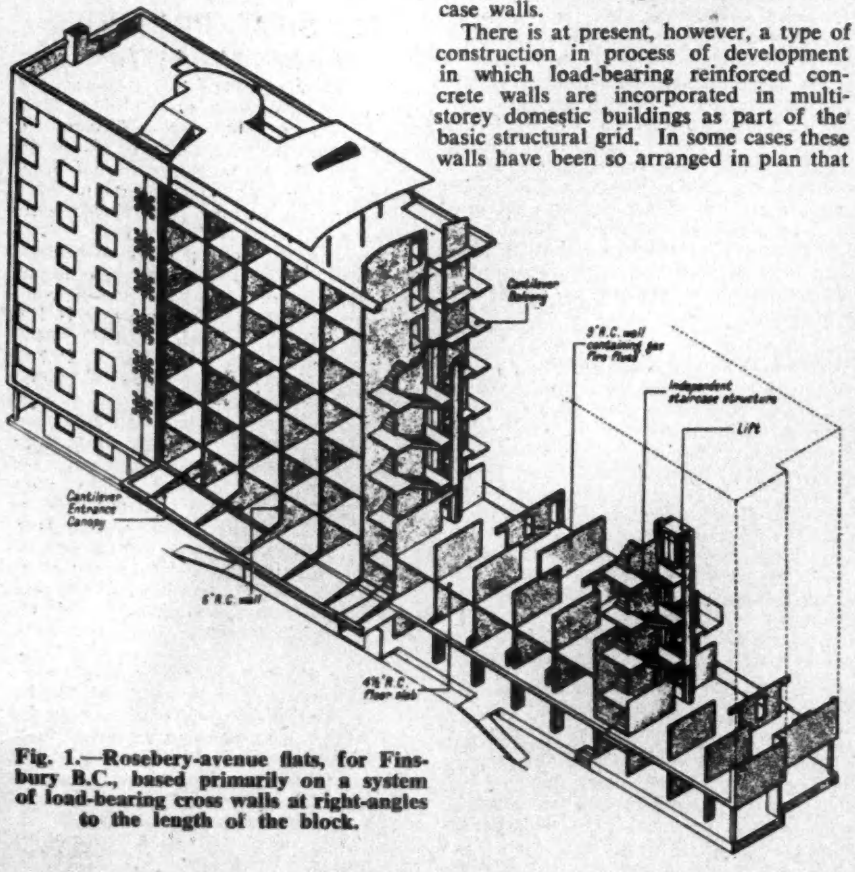

Fig. 1.—Rosebery-avenue flats, for Finsbury B.C., based primarily on a system of load-bearing cross walls at right-angles to the length of the block.

Some General Observations.

It is considered that a fair comparison of cost between the usual frame-type of construction and load-bearing reinforced concrete wall construction could only be made at present for individual projects, in terms of the extent to which functional and æsthetic requirements were satisfied, costs of labour and materials, the availabilities of labour and materials, and present design regulations, constructional methods and workmanship standards. There are, however, certain general observations worthy of mention, which are relevant to a more fundamental, if in some cases a less immediately-practical, comparison. The first of these is the suggestion that in using reinforced concrete in the column-and-beam frame the material is not employed to full advantage for, in contrast with structural steel, reinforced concrete is by nature such that the wall and shell are more natural basic structural units than the column and beam. The use of reinforced concrete in a similar manner to that in which structural steel is used is considered by this school of thought to neglect the comparative ease with which it can be fabricated to satisfy strength requirements and enclose space at one and the same time. To some extent, this point of view has found practical expression in shell concrete construction.

The second point is of direct practical importance in the search for economy in building construction. There can be no reasonable doubt that the strengthening and stiffening effects of the walls, floors and roof of a framed building are considerable. Structural tests on two-storey houses at the Building Research Station have shown this to be true even for small buildings. Thus, from the standpoint of economy in materials alone, design prac-

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tice which to an important extent ignores the structural contributions of these components would seem to involve unnecessary expenditure. No doubt when more technical knowledge has been obtained, advantage will be taken of this factor and greater economy achieved in the design of framed buildings in general.

The final point mentioned here arises in connection with architectural planning and internal treatment. It is that, in general, the avoidance of projecting columns and beams in the rooms of a domestic building in particular is an advantage. This is a natural consequence of the use of load-bearing walls in "box-frame" construction.

Structural Design of the Walls.

The designer wishing to use load-bearing reinforced concrete walls in a multi-storey building in this country has as a guide to good practice the British Standard Code of Practice, "The Structural Use of Normal Reinforced Concrete in Buildings," which includes only general design recommendations for walls of this kind, however. A fair summary of the present design position and typical design requirements of building authorities may be obtained by studying the Code, the building bye-laws of the L.C.C. and recent and present building schemes in which load-bearing reinforced concrete walls are a feature. Familiarity with details of the building schemes is of particular value, because it supplements the information contained in the Code and the bye-laws, and without it the picture is incomplete. The reason for this is that load-bearing reinforced concrete wall construction is regarded as a "special" form of construction inadequately covered by building regulations. Existing regulations are recognised as unsatisfactory in this respect not only by designers dependent on a building authority for approval of their work, but also by the building authorities themselves. This has produced a state of affairs in which the building authority judges the design of a load-bearing reinforced concrete wall on its merits in relation to the scheme in which it is to be used, on the general terms of existing bye-laws, but not always strictly in accordance with them. Thus, at the present time the granting of "waivers" may be described as almost an established feature of load-bearing reinforced concrete wall design.

This position is unsatisfactory to all who desire utmost economy in construction with a good standard of workmanship, and particularly so for the designer who is uncertain of the reception his proposals are likely to meet. It arises from a pronounced shortage of technical knowledge of the strength and performance of the walls under load, of their behaviour in combination with one another and with floors, and the need for further development of methods of construction by which advantage may be taken of their strength whilst a good standard of workmanship is maintained.

The recent Code for normal reinforced concrete in buildings contains a clause dealing with walls designed to carry vertical loads, in which it recommends that they should be designed generally in accordance with its column recommendations. This recommendation is similar to that of the earlier Code, of the Reinforced Concrete Structures Committee of the Building Research Board, of 1934. By its provisions the Code retains column treatment of the wall with respect to compression bending and slenderness, but contributes, in the form of a recommendation, towards a saving in steel and greater facility in construction. The new recommended minimum quantities of vertical steel and lateral steel parallel to the wall faces are, in general, intermediate between the minimum steel recommended

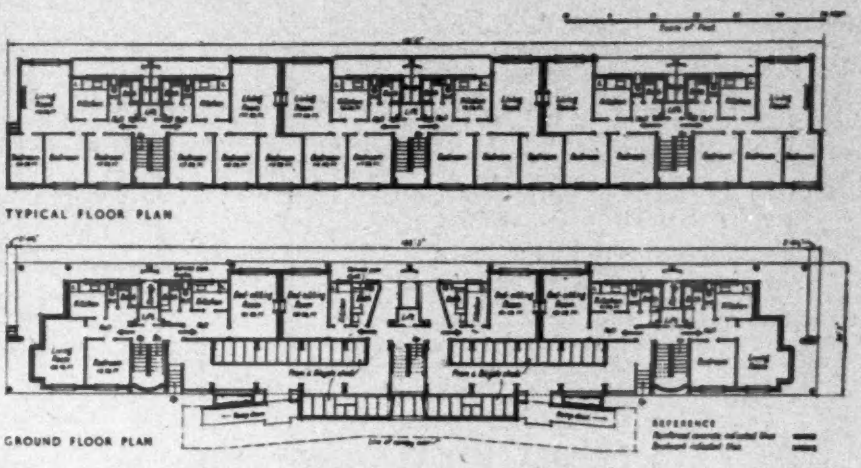


Fig. 4.—Rosebery-avenue flats. Floor plans.

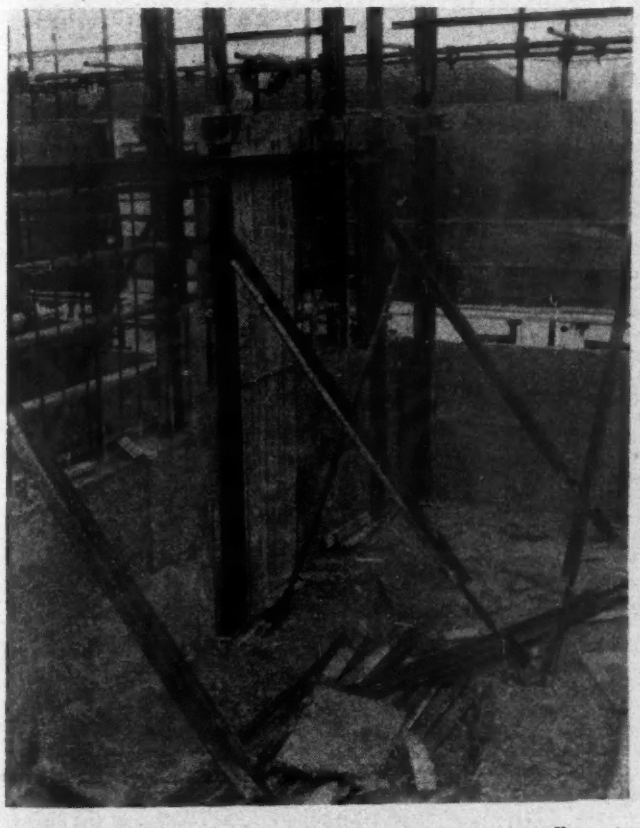


Fig. 3.—View showing wood wool lining to cross wall, cast to cill level, at Minerva Estate flats, Bethnal Green.

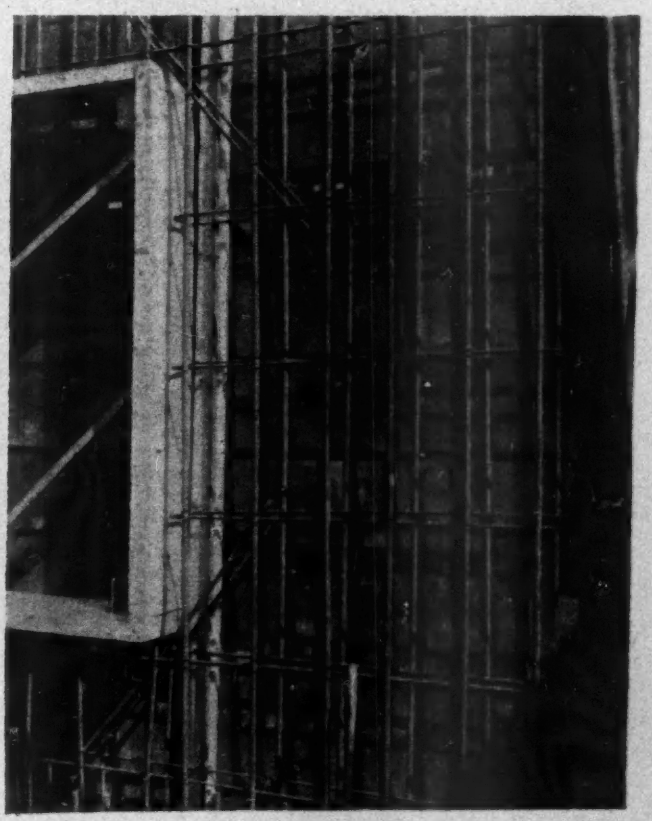


Fig 5.—Rosebery-avenue flats. Detail of cross wall with opening.

for columns in the same Code and the minimum shrinkage steel recommended for the so-called "plain concrete" wall in the Draft Code of Practice "Structural Recommendations for Load-bearing Walls." They do, in fact, approach the minimum shrinkage steel requirement of the latter Code, of 0.4 per cent. of the volume of the concrete in the plain wall, disposed equally in the vertical and horizontal directions.

After giving details of design practice in other countries, the speaker went on to say: These remarks may serve to show how dependent is wall design on the requirements specified for columns, to frame which considerable test data have been obtained. No doubt from the structural standpoint the application of column design to wall design is a safe procedure, but there are good grounds for the belief that the wall and the column are not similar in all respects in their behaviour under load.

Construction in the London Area.

To illustrate the manner in which load-bearing reinforced concrete walls have and are being used, a summary is included here of certain recent and contemporary schemes. They fall into the following groups:—

(i) In which floors and roof are carried by a system of cross walls, end walls and staircase walls, and columns and beams are mainly excluded. Where they do occur, columns are used only for special planning requirements and/or for the sake of appearance.

(ii) In which the floors and roof are carried by the external walls, the staircase walls and only a limited number of cross walls, and columns and beams are mainly excluded.

(iii) In which the floors and roof are carried as in (ii) and by a longitudinal spine of one or more rows of columns and beams.

This grouping also conforms with the manner in which loads are assumed by the designer to be transmitted to the foundations of the buildings. For buildings in the group (i) the floors are designed to span between the cross walls and staircase walls and, by virtue of the number of cross walls, the lateral resistance of the building to wind is great even though the building may be relatively tall. Thus, no special planning is required to resist wind loads. In group (ii), however, the floors are designed to span between the front and back walls (the longer external walls), or in both directions between those walls and the cross walls. Wind loads are transmitted to the staircase walls and a limited number of cross walls by the floors. In group (iii) floors are designed to span between the front and back walls and across the longitudinal spine of columns and beams, and, as in group (ii), staircase walls and special cross walls provide additional lateral resistance to wind.

Under (i) may be grouped Evelyn Court, Hackney (1934), Minerva Estate, Bethnal Green (1948), and Roseberry-avenue, Finsbury, housing scheme, which is at present under construction. The present construction of the Pimlico Housing Scheme is an instance of (ii). and Highpoint, Highgate (1935), Hill Court, Brixton (1936), the present Woodberry Down Housing Scheme in Stoke Newington, and Highfield Court, Golders Green (1935), are examples included in group (iii).

In Evelyn Court, Hackney, load-bearing reinforced concrete cross walls and end walls, generally at about 12 ft. centres but at about 8 ft. centres at the staircases, are founded on strip footings. These walls are 7 in. thick throughout and were designed as columns. Their steel and that of the 5 in. floor slabs are uniform from storey to storey. The vertical wall steel consists of $\frac{1}{2}$ in. bars at $8\frac{1}{2}$ in. centres on each face. Zig-zag binders of $\frac{1}{4}$ in. diameter are at 12 in. centres, and additional $\frac{1}{2}$ in. horizontal bars were placed above the openings.

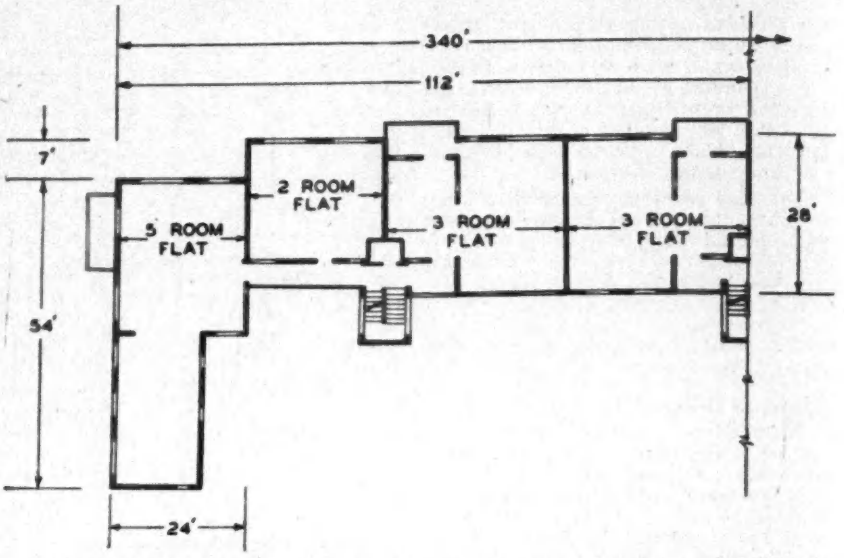


Fig. 6.—Pimlico Housing Scheme. Typical part-floor plan, nine-storey block.

The eight, four-storey blocks in Bethnal Green (Figs. 2 and 3) have cross-walls supported by strip footings on mass concrete foundations, and contain $\frac{1}{2}$ in. vertical bars at $10\frac{1}{2}$ in. centres on each face, together with $\frac{1}{4}$ in. zig-zag binders at 12 in. centres. At junctions between the cross walls and the front and back walls of the block, which are also of reinforced concrete, the cross walls contain $\frac{1}{2}$ in. bars at $10\frac{1}{2}$ or 12 in. centres as additional horizontal steel. Two $\frac{1}{2}$ in. bars also occur above openings in these walls. The front and back walls have a 7 in. thickness of reinforced concrete and a special concrete facing 2 in. thick and integral with it. On their outer faces there are $\frac{1}{2}$ in. vertical bars at 12 in. centres in general, and on the inner faces $\frac{3}{8}$ in. bars at 12 in. centres. The horizontal steel generally consists of $\frac{1}{2}$ in. or double-twisted $\frac{1}{4}$ in. bars at $10\frac{1}{2}$ in. centres on each face. Above window openings additional $\frac{1}{2}$ in. or $\frac{3}{8}$ in. horizontal bars were placed, and across the corners of these openings 5/16 in. zig-zag bars were inclined at 45 deg.

At Rosebery-avenue (see Figs. 4 and 5), the $4\frac{1}{2}$ in. floor slabs and the front and back brick walls are carried in the main by a system of staggered, reinforced concrete cross walls and end walls above a raft foundation. To obtain to some extent an open plan on the ground floor and for æsthetic reasons, some of the cross walls and the end walls give place to columns and longitudinal spine walls in the first storey. At the back of the block are cantilevered balconies. The staircases are cantilevered from their reinforced concrete spine walls, and are separated from the boundary walls of the staircase wells by 1 in. air gaps to reduce sound transmission by the structure from the staircases. The load-bearing cross walls are 6 in. thick up to the fifth floor and 5 in. thick above that level in general, but certain of the cross walls, containing gas fire flues, are 9 in. thick. These walls and the floors are cast in lifts of one storey, and in laminated, steel shuttering except where a 1 in. wood wool lining is installed or it is preferable to use timber.

The nine-storey flats under construction in Pimlico are an example of the use of load-bearing external walls in combination with certain cross walls, the latter providing the major resistance to wind at right angles to the length of the block. The floors are designed to span in both directions between the external walls and the cross walls, or between the external walls alone. The present block is part of an extensive scheme which will provide 1,576 flats in a series of three, four, seven and nine-storey blocks. An outline of part of a typical floor plan of a nine-storey block is given in Fig. 6. The load-bearing walls are 10 in. and 12 in. thick in the basement and 7 in. thick above the ground floor. The reinforcement comprises vertical and horizontal bars with zig-zag horizontal ties.

At the Highpoint flats, Highgate, columns are used in the first storey and the first floor is supported by a system of columns, staircase walls and certain external and spine walls. Above that floor the other floors are supported by the staircase walls, the external walls, short cross walls, and a central spine comprising a row of short wall strips and superimposed beams. The system, repeated from storey to storey above the first floor, is shown in Fig. 7.

A longitudinal row of columns and beams, forming a spine, was incorporated in alternate storeys of one of the two blocks known as Hill Court, Brixton, which contains a number of maisonettes, the bedrooms of which lie on the floors above the living-rooms. The plan of the first, third and fifth storeys of this block differs from that of the others. The second and third floor plans are outlined in Fig. 8. The 5-in. reinforced concrete external walls are load-bearing, and the upper living-room floors are each supported by those walls, a longitudinal column-and-beam spine, and the reinforced concrete party walls of the bedroom storey beneath. In the bedroom storeys the party walls extend from front to back of the block. The columns of the spine continue in the living-room storeys and support cross partitions with beams over. These partitions and superimposed beams extend to a partitioned access corridor at the back of the block and serving the living rooms. Similarly, in the living-rooms the reinforced concrete party walls extend from the front wall to the corri-

dor. Thus the bedroom floors are supported by external walls, by the columns and, from the front wall to the corridor, by the party walls and the cross-beams.

Load-bearing external walls, staircase walls and cross-walls, with a single row of columns and beams, also form a part of the roughly rectangular plan of the two eight-storey blocks of flats under construction at Woodberry Down.

The last scheme outlined here, and included in group (iii), is Highfield Court, Golders Green. This three-storey block of 13 flats is L-shaped in plan (Fig. 9). The two arms of the block radiate from a staircase, and the spine of each arm supports hollow-tile floors between load-bearing external walls. The load-bearing content of the external walls comprises wall-beams 5 in. thick and 4 ft. 6 in. deep—the depth between window openings. These wall-beams, separated by short wall strips between the window jambs, were designed to support their share of the floor loads. They bear on 8-in. party walls, the end walls and the staircase walls.

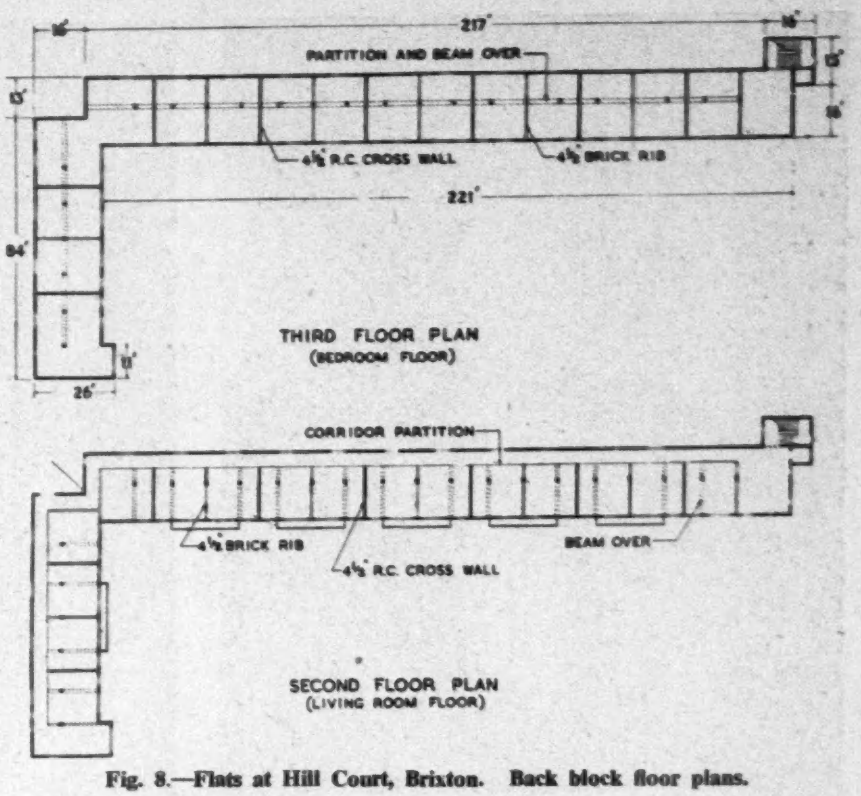


Fig. 8.—Flats at Hill Court, Brixton. Back block floor plans.

B.R.S. Research.

Describing research at the Building Research Station, Mr. Seddon went on to say:—

As an aid to greater economy in the *design* of walls and to assist the architect to use them to greater advantage, I consider that further knowledge is required of the following major points:—

(1) The strength and performance of plain concrete walls in axial and eccentric compression, in flexure, and under combinations of bending and compression. This includes the effects of slenderness, wall length, openings, and of both distributed and concentrated loads.

(2) The extent to which shrinkage and temperature stresses in plain concrete walls require the provision of steel to restrain undesirable cracking.

(3) The contribution to strength made by vertical and horizontal steel in reinforced concrete walls, including the extent to which lateral ties are needed between multiple layers and additional steel is needed around openings.

(4) The behaviour under load of walls and floors acting together, and of walls in combination with one another.

The need for research and development of *methods of construction* is considered to lie in the provision of information on the following major points:—

(a) The suitability of types of timber and steel formwork for economy and speed in casting thin walls and for overcoming the difficulties encountered in locating the steel and pouring the concrete. Included in this are means of obtaining either a fair face when the forms are stripped, or a face suitable for the direct application of a wall finish requiring a key to the surface, and the use of permanent shuttering to satisfy other than structural requirements.

(b) Satisfactory means of locating the reinforcement during the pouring of concrete in thin walls, with a view to avoiding disturbance of the reinforcement without using an unduly-high-workability concrete and entailing a loss in concrete strength. Associated with this is the extent to which lateral ties or binders are required between two layers of steel.

(c) The degree of workability required of fresh concrete for thin walls when the concrete is to be compacted by ramming or vibration; the possibility of using special concretes; and the use of high-workability concrete with the vacuum concrete technique.

(d) The suitability of types of wall treatment and finish from the standpoints of durability and appearance.

(e) The nature and location of suitable construction joints in thin walls and means of masking them. Associated with this is point (d) and the extent to which discontinuity assists sound insulation.

(f) The nature and location of suitable expansion and contraction joints to relieve shrinkage and temperature stresses in long, multi-storey buildings.

(g) The extent to which building costs may be reduced by increased control of concrete quality.

The research programme, which is at an early stage, has commenced with laboratory investigation of points (1) and (3) and the accumulation of information relating to present constructional methods. A paper dealing with the first structural tests, on plain concrete walls, was submitted to the Liége Congress (1948) of the International Association for Bridge and Structural Engineering in September last. This paper is to be published in the Final Report of the Congress. In the wall test series, with which it is con-

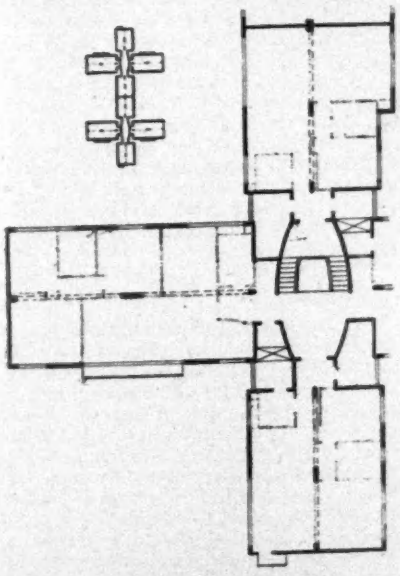


Fig. 7.—Highpoint flats. Upper floor plan.

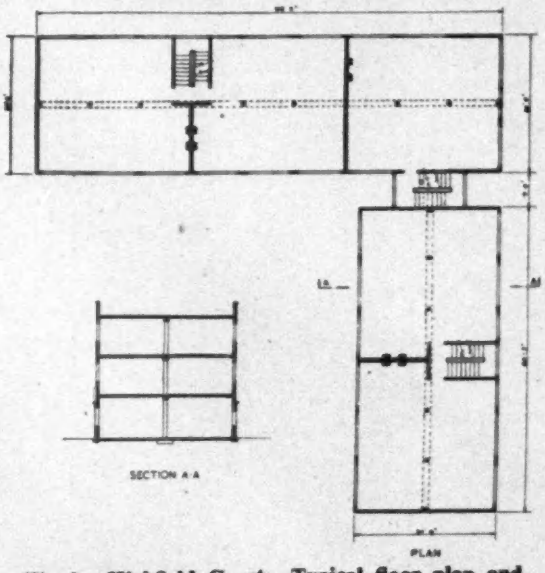


Fig 9.—Highfield Court. Typical floor plan and cross-section.

Fig. 10.—A test wall assembly: concrete wall 9 ft. high, 6 ft. long and 4 in. thick.

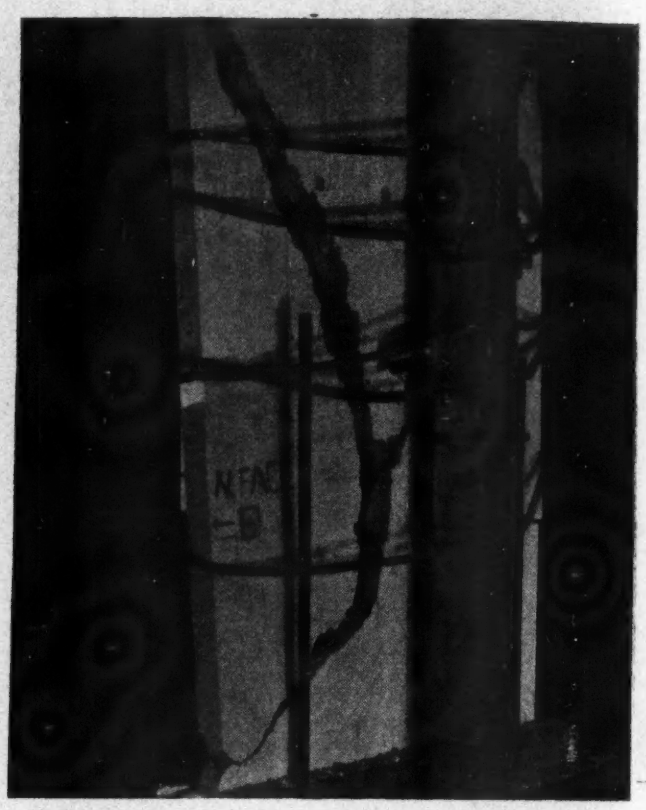


Fig 11.—Concrete wall after test under distributed axial compression: wall failed at 350 tons.

cerned the test walls were 4 in. in thickness, of single-storey height, of lengths from 6 ft. to 1 ft. 6 in., and were subjected to axial compression distributed over their full lengths. A typical test assembly is shown in Fig. 10, and a view of the same wall after failure can be seen in Fig. 11. The walls were cast in one lift on reinforced concrete pallets, to which they were lightly keyed by short steel dowels. As the tops of the walls and the pallets were bedded on the loading beams of the testing machine (Fig. 10) and the spherical seatings of the testing machine were locked during the tests, it may be said that appreciable position- and direction-fixity existed at the loaded boundaries of the walls. Control specimens, cast in the same concrete as the wall and at the same time, included 4-in. cubes which were stored in air at 64 deg. F. and a relative humidity of 65 per cent. after demoulding. These were tested at the same time as the wall test was carried out, generally 14 days after casting, and here their mean crushing stress will be referred to as the "cube strength."

In all the tests the wall failed by crushing, and neither buckling nor appreciable bending occurred. The ultimate mean compressive stress of the wall (the "wall strength") averaged from about 75 to 65 per cent. of the cube strength as the wall length was reduced from 6 ft. to 1 ft. 6 in., with a reduction in the average value of the ratio wall strength : cube strength as the wall length was reduced. No significant decrease in the value of the ratio for walls of the same length was evident for cube strengths from about 2,500 to 5,000 lb./in.^{2}. Thus a fair average value of the ultimate load of a wall with a corresponding cube strength of, say, 3,500 lb./in.^{2} and a length of 6 ft. was about 56 tons/ft. length. One of the walls of the same length, for which the cube strength at 14 days was 5,260 lb./in.^{2} remained unbroken at a load of 500 tons—the capacity of the testing machine.

It is of interest to compare these test data with the present Codes of Practice recommendations relating to permissible stresses and the reduction factors to be applied to walls of certain slenderness ratios, assuming that position- and direction-fixity existed in the tests and ignoring other provisions of the Codes. The Draft Code for load-bearing walls suggests a permissible stress of 430 lb./in.^{2} for a preliminary test cube strength at 28 days of 4,000 lb./in.^{2}, or a maximum design load of 9.2 tons/ft. length. The 14-day tests suggest that a design load of that magnitude would provide a load factor (*i.e.* the ratio wall strength : permissible compressive stress) of about 7 for a wall 6 ft. long, and of about 6 for a wall 1 ft. 6 in. long. For a preliminary test cube strength at 28 days of 3,500 lb./in.^{2} the Code for reinforced concrete suggests a permissible stress of 630 lb./in.^{2}, or a maximum design load of 13.5 tons/ft. length. The tests suggest that, with this design load, load factors from about 4¼ to 3½ would obtain for the wall lengths investigated. In making the above comparisons between the test data and present Code recommendations it must be emphasised, however, that the test walls were cast and experimented upon with high standards of workmanship and control of materials, etc.

In subsequent tests on plain concrete walls the importance of the wall length in determining the wall strength under similar loading was confirmed. The effect of changes in the slenderness ratio (unsupported height : thickness) has been investigated to some extent and, with a view to reducing the size of future test walls and assemblies, model walls have been tested to indicate the extent of "scale-effect." Some of these models were tested under eccentric loading distributed over their full lengths and centered at the edge of the "middle third." A start has also been made on an investigation of the performance and strength of plain walls under concentrated axial compression and the effect of the addition of horizontal steel.

Conclusion.

Much study and experimental work are needed to supply the information which can aid the use of load-bearing reinforced-concrete walls in multi-storey buildings with greater economy in the cost of construction. The Building Research Station research programme is one means whereby a start has been made to gain some of this information. In the immediate future it is hoped to obtain further data from wall tests designed to investigate, in particular, the contribution to strength made by multiple layers of steel, and the extent to which special precautions should be taken around openings in the walls.

APPENDIX

FOLLOWING are details of the buildings mentioned and illustrated in this summary of Mr. Seddon's paper :—

EVELYN COURT, HACKNEY :—Architects, Sir John Burnet, Tait and Lorne ; contractors, Holland & Hannen and Cubitts, Ltd.

HIGHFIELD COURT, GOLDERS GREEN :—Architect, A. V. Pilichowski ; contractors, J. L. Kier & Co., Ltd.

HIGHPOINT, HIGHGATE :—Architects, Messrs. Lubetkin & Tecton ; contractors, J. L. Kier & Co., Ltd.

HILL COURT, BRIXTON :—Architect, Edwin D. Griffiths ; contractors, J. L. Kier & Co., Ltd.

MINERVA ESTATE, BETHNAL GREEN, AND WOODBERRY DOWN HOUSING SCHEME, STOKE NEWINGTON :—Architects, C. H. Walker, Director of Housing and Valuer, L.C.C. Sydney Howard, Housing Architect, L.C.C. ; contractors, Holland & Hannen and Cubitts, Ltd.

PIMLICO HOUSING SCHEME :—Architects, Messrs. Powell and Moya ; consulting engineers, Messrs. Scott & Wilson ; contractors, Holloway Bros. (London), Ltd.

ROSEBERY-AVENUE HOUSING SCHEME, FINSBURY :—Architects, Tecton ; consulting engineer, Ove N. Arup ; contractors, William Moss & Sons, Ltd.

THE "FREE" LIMITS

HINT TO SUB-CONTRACTORS

A HINT that the values of building work that may be carried out without a licence may be reviewed before long was given by MR. C. W. KEY, M.P., Minister of Works, when he spoke at a luncheon of the Federation of Associations of Specialists and Sub-contractors at the Dorchester Hotel, London, on December 2.

Mr. Key, who was responding to the toast of "H.M. Government," proposed by Mr. W. R. Cowen, M.R.San.I., M.I.H.V.E., Chairman of the Council of the Federation, referred first of all to the cuts in capital expenditure made at the end of last year and said: "To-day the jobs are being finished at a quicker rate than they were; houses are being completed in 11 months, whereas a year ago they took 15 months Moreover, the work that is being started each month is reasonably in balance with the materials available."

The Minister then spoke of the recent increase in the amounts for unlicensed building work and said: "I know that the decision proved welcome and useful, not only to the industry, but also to local authorities and the general public. With regard to the £1,000 limit for certain types of buildings I know that it is your wish that I should extend it to all classes of work. I cannot go any further than that at the moment, but sooner or later we shall be reviewing the position and we shall give consideration to your wishes."

Mr. Key went on to mention the great need for a balanced force of craftsmen in the building industry and said that the work that was being done by the Building Apprenticeship Training Council was, in his submission, of the utmost value to the industry. The new Council on Apprenticeship and Training in the electrical industry was just starting; it had a very big task before it and they wished the Council every success.

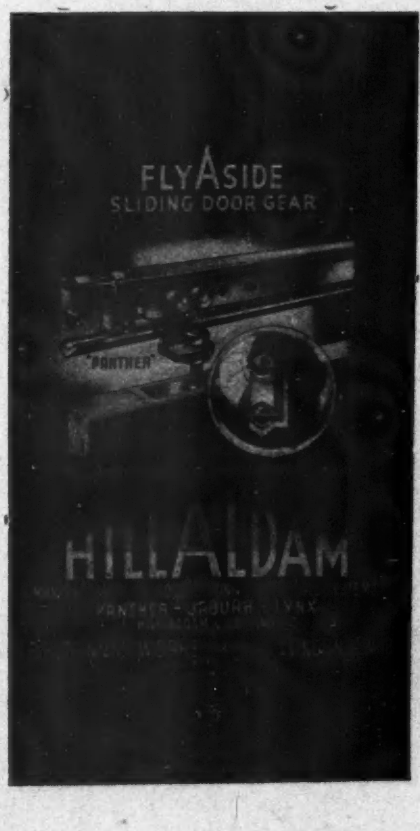
"To maintain a skilled labour force in the building industry at present, 22,000 apprentices must be recruited annually," the Minister continued. "I am afraid we are falling considerably short of that figure. The reluctance of employers to enter into long-term engagements may be due to a feeling of uncertainty for the future. But grounds for that uncertainty no longer exist. Our present programme allows for sufficient work which will easily absorb the numbers of apprentices that are required. If we could only get that over to the people in the industry I think we should have a good chance of maintaining the labour force that is necessary.

"I know that the training of apprentices is going to be difficult. It means we shall need a balanced programme of work providing for the industrial, economic and social needs of the country. We are already making great progress with one aspect of social development—housing—but at the same time we have not overlooked the economic needs of the nation, and since the war the industrial and agricultural work has been carried out to a total value of £426,000,000. We have tried to preserve a proper balance between economic needs and social aspirations and we must go on preserving that balance."

A reference to the Working Party inquiring into the organisation and efficiency of building operations was made by MR. COWEN in proposing the toast. He said: "The Federation feels there is a particular aspect of the Working Party's inquiries that will be of great value. The building industry has, since the war, and even before that, been subject to much public criticism, informed, ill-informed or even malicious. The only voices which have not really been heard by the public are those of the men responsible in the last resort for the running of the industry and for the satisfaction of the claims made upon it. It is to their views and their suggestions that we hope the Working Party, to whom the preoccupations both of political platforms and the public Press are irrelevant, will pay attention. Speaking for the employers' side of the industry, there has been some reaction from the previous tendency to make an 'Aunt Sally' of the building contractors and the first report of the Minister of Health's Committee on Housing Costs makes it clear that serious as may be the increase in the price of houses, it is not into the pockets of the contractor that that increase is finding its way."

Urging that a more varied programme be placed before the industry in order to provide it with the chance to make itself more efficient Mr. Cowen said that if all went well, there would be in the years to come a demand for every class of construction to meet which the industry would have to deploy itself fully. In preparation for that day, there must in every trade be kept together a nucleus of craftsmen to perpetuate their skill and to transmit their knowledge to others. In order to keep together each nucleus there must be in each annual programme some proportion, however small, of appropriate work to provide a practical field for the maintenance and transmission of skill and the development of technique. A balanced force must be maintained through the years of adversity, and to achieve that balanced force a balanced programme would be necessary.

The toast of "The Guests" was proposed by MR. H. BLACKMAN, B.Sc., chairman of the Federation's executive committee, and MR. A. B. KNAPP-FISHER, vice-president, R.I.B.A., replied.



IN PARLIAMENT

Firegrates and Stoves.

MR. COLLINS asked the Minister of Health if he would extend to all new houses the instruction which had been given to local authorities prohibiting the installation of firegrates and stoves of unsatisfactory types.

MR. BEVAN said he was consulting the Minister of Works about the possibility of including a condition to this effect in licences issued for the erection of houses by private developers.

Requisitioned Properties.

SIR WALDRON SMITHERS asked the Minister of Health how many properties were still requisitioned at the latest convenient date; and what steps he was taking to ensure that requisitioned houses would be released as soon as possible.

MR. BEVAN said the number of properties held under requisition by his Department on November 1, 1948, was 97,197. Requisitioned houses would be released as speedily as circumstances allowed.

Official Staffs.

MR. GEOFFERY COOPER asked the Minister of Works what steps were being taken, in view of the recent elimination of controls on a number of building materials, to reduce to the utmost the number of officials in his Department and in the regional organisation who were responsible for handling these controls; and what was the number of officials who had already been released for absorption by productive industry since the announcement of the elimination of these controls on November 1.

MR. KEY said a careful review had been made of the number of staff who could be released as a result of the elimination on November 1 of the control over the distribution of building materials. Eighteen had already been released from the Ministry or transferred to vacancies on other work. More would be released shortly.

Houses in Edinburgh.

LT.-COMMANDER CLARK HUTCHISON asked the Secretary of State for Scotland how many houses were erected in Edinburgh by private builders and the Corporation, respectively, during the years 1932-38 inclusive.

MR. WOODBURN said that during the period referred to private builders erected 22,637 houses, of which 7,157 were to the order of the Corporation.

Scottish Progress.

MR. WILLIS asked the Secretary of State for Scotland if he would make a statement on the housing programme for Scotland for 1949.

MR. WOODBURN said they estimated that the building trade would maintain a completion rate of 20,000 permanent houses per year although they felt that this might be improved upon if conditions throughout the year were favourable. In order that the maximum number of houses should be completed in the year it was essential that the programme should be brought into balance. Strict control would therefore still have to be exercised over the approval of new tenders to avoid the dissipation of building force labour over too many houses. The starting of new houses would, however, continue to be authorised for priority cases such as agricultural workers, miners and key workers and for certain other exceptional needs.

Private Building Licences.

MR. BOYD-CARPENTER asked the Minister of Health what advice he had given local authorities in connection with the issue of building licences to persons willing and able to erect houses with their own labour and materials; and whether licences granted in such cases counted against the local authorities' permitted total of work.

MR. BEVAN referred the hon. member to Circular 108/48. The answer to the last part of the question was: "Yes, sir."

MAJOR LEGGE-BOURKE asked if the Minister did not realise that the circular to which he had referred had, in fact, resulted in fewer houses being built by private enterprise, and did he not realise that there was a waiting list of people desiring to build houses.

MR. BEVAN.—If it is the case that the effect of the circular is to result in fewer houses being built for sale than for letting, then the hon. gentleman is perfectly correct. That was the object of the circular.

MR. E. FLETCHER.—Would the Minister advise the local authorities that, in granting licences, they should not give preference merely to people who live in their own areas, because to do so would be to inflict hardship on those who live in the Metropolitan area?

MR. BEVAN.—It is a hardship when people are living in one place and working in another. I have asked a subcommittee of the Central Housing Advisory Committee to advise me on the matter.

MRS. MANNING.—Will the Minister take into account the fact that people bought land outside the area in which they live, intending to build their own houses there when they retired and gave up their jobs?

MR. BEVAN.—I dare say that there were many citizens of this country who bought land before the war and who have not been able to build on it since and, indeed, will not be able to build on it so long as there are numbers of people who cannot afford to buy a house and must rent one.

War-damaged Houses.

SIR PETER MACDONALD asked the Minister of Health whether he would now make arrangements to relax the present restrictions affecting the owners of war-destroyed houses in respect of which a value payment had been agreed, so as to remove the present disadvantage of such owners as compared with those who were able to replace houses in respect of which a cost of works settlement had been made.

MR. BEVAN said it was within the discretion of a local authority to issue licences for the erection of houses for private individuals up to one-fifth of their allocation and he had no doubt that careful consideration was given to any application of the kind in question. The total number of houses which could be built was limited by the labour and materials available; it would not, therefore, be possible to issue additional licences for this type of house.

Reconditioning.

MR. KEELING asked the Minister of Health whether he would consult organisations representing property owners before introducing the Bill for the improvement of existing dwellings.

MR. BEVAN said he would not, but he was ready to consider any representations which they might care to make.

OBITUARY

Samuel Grundy, F.R.I.B.A., A.M.T.P.I.

WE regret to record the death, on November 20, at a Carlisle nursing home, of Mr. Samuel Grundy, F.R.I.B.A., A.M.T.P.I., aged 69. He practised in the firm of his grandfather and father, J. W. Grundy and Son, Central Buildings, Brogden-street, Ulverston, Lancs., and was responsible for much architecture in connection with churches and public buildings, including the new post-office and market hall at Ulverston.

Frederick W. Rowe, L.R.I.B.A.

We regret to record the death, at the age of 66, of Mr. Frederick W. Rowe, L.R.I.B.A., of Blanquettes-ave., Worcester. He was a partner in the firm of Henry Rowe and Sons, architects and surveyors, Foregate-street, Worcester, for 30 years.

A. D. S. Rice, C.C., J.P., D.Sc. (Hon.).

The following appreciation of the late Major A. D. S. Rice, C.C., J.P., D.Sc. (Hon.), whose death was reported in our issue of November 19, has been received from a correspondent.

The all-too-early passing, on November 9, of Major Rice will be regretted by his wide circle of friends. By his death the building industry has lost a distinguished personality. He came of a long line of builders and was a builder by nature. The qualities in his character were recognised not only by the commercial circles and interests of the City, but, as a singular distinction, by London University, which saw fit to bestow upon him the honorary degree of Doctor of Science. Major Rice was shrewd in judgment. He had the ability of stimulating rather than guiding discussion, and so always drew out the maximum of views on any of the many subjects in which he was interested. He never disguised his natural dislike for "parish pump" politics and the use of mere slick debating points in responsible discussion. An honourable aim was always the justification of his endeavours.

As a chairman, in which office he rendered a great service both in the building industry and in the City, he was more kindly than patient and was able to attain agreement in a minimum of time. He showed a cultivated use of language rare among industrialists, and possessed that unusual quality of being a man of action with a keen and informed mind for detail.

An outstanding instance of his work on behalf of the industry was his pioneer effort in getting the War Damage Levy Scheme for buildings drafted by a special committee (of which he was chairman) of the Building Industries National Council, a scheme which was ultimately adopted in principle by the Government, following earlier official statements to the effect that it was impracticable to create any scheme of insurance against war damage. The country is undoubtedly indebted to him for this spirited and far-sighted piece of work.

Comparatively few men of the industry have left as good a record of industrial and public service as Major Rice. For this he will always remain honoured. For his charitable outlook and for the qualities of his character he will be widely missed.

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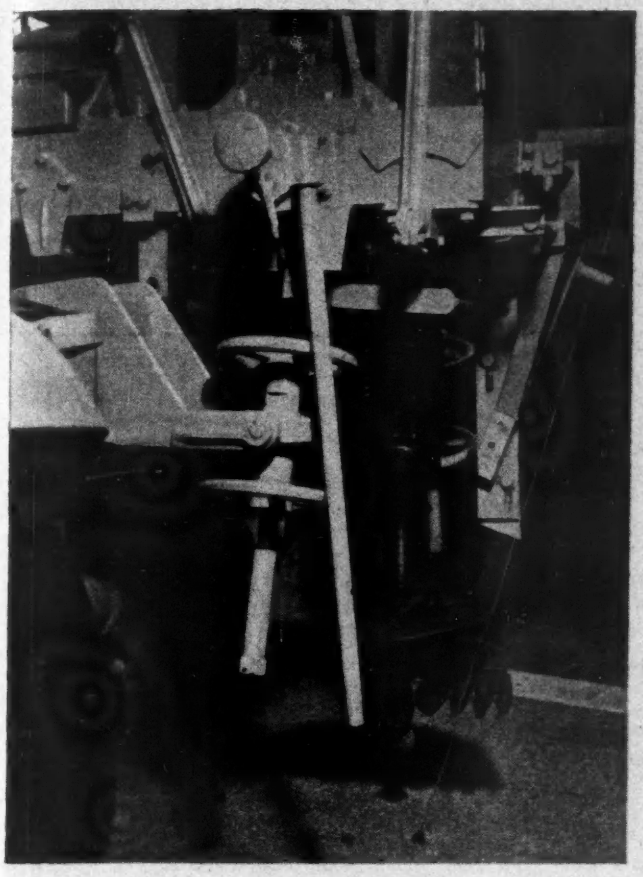
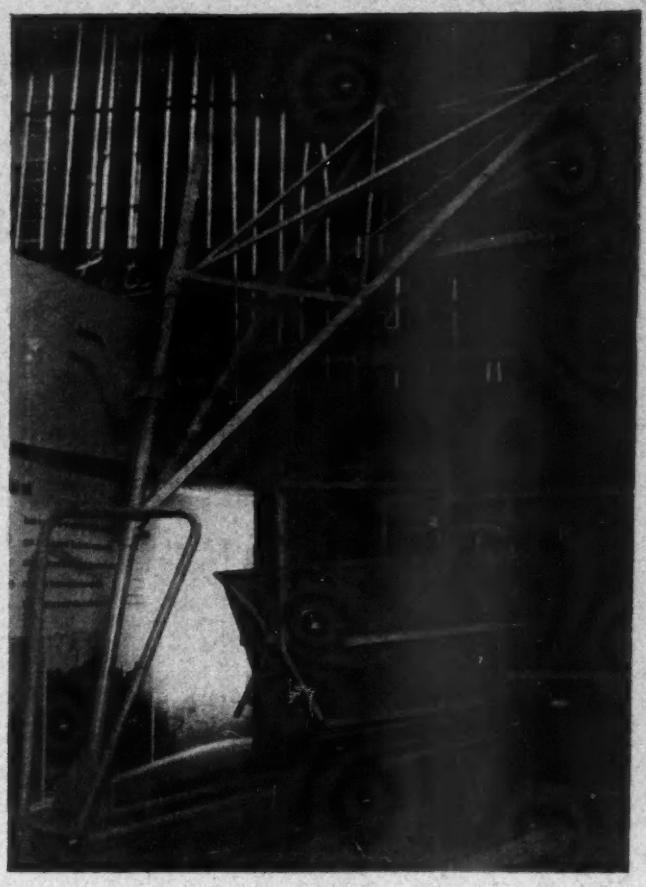
A POPLAR PLANNING EXHIBITION

MANY exhibitions designed to bring the work of local government to the attention of the general public devote too much space to explanatory text. Mr. H. J. Gordon, A.R.I.B.A., the designer of "Poplar Builds," an exhibition now on view at Poplar central library, has not made this error in laying out details of the borough's work in post-war reconstruction. Mr. Gordon, who is senior assistant in the architect's section of the borough engineer's and surveyor's department, has made intelligent use of pictures and of bright colours to attract the interest of the casual visitor. Apart from the obvious advantage of making residents conscious of the work of local administration the exhibition has added value in that it sets out to kill prejudice. Many people in this neighbourhood are inclined to view the building of flats with resentment; they prefer any type of house, whatever its condition. But with the aid of illustrations one section of the exhibition shows how they once lived, with 250 people to the acre, and points out clearly that it would be impossible for them to live in a proportion of 40 to the acre, in individual houses. The administrative machinery which has to be operated before a building can be erected is simply explained with the aid of a job sheet linked to representations of the various departments concerned. Bright colours make three panels giving details of construction less dull to the layman than they might otherwise be; progress reports on building schemes take the form of photographs; and in cases where plans are exhibited each part of the plan is linked to photographs of the corresponding interior. Of particular interest is a model of the borough's design for three-storey houses, which it hopes to erect in proposed neighbourhood units. A diagram illustrates the advantage of this type of house; 72 can fill the same area as that needed for 56 traditional houses.

This display will be on view at the central library until December 18, when it will commence a tour of other libraries in the borough. In time, each department of the borough council will be represented by an exhibition.



A mobile earth auger.



A portable concreting boom.

Illustrated above are two of the exhibits shown by the Ministry of Works at the recent Public Health and Municipal Engineering Exhibition held at Olympia.

CODES OF PRACTICE

TIMBER FLOORING

THE Codes of Practice Committee has issued as a draft for comment, Code 201, "Timber Flooring," prepared by a committee convened by the R.I.B.A. This code has three sub-codes of which 201.101, "Hardwood and Softwood Board and Strip Flooring," and 201.103, "Plywood Flooring," are included in this document. The sub-code 201.102, "Woodblock Flooring," which completes this group of floor finishes, has already been published separately for comment.

Code 201, "Timber Flooring," gives the general principles of design for timber flooring, the species of timber available, the essential factors to be considered in the choice of timber for a particular situation and the precautions to be observed in laying on suspended subfloors and on solid sub-floors in direct contact with the ground. Particular reference is made to the prevention of dry rot and advice is given on treatment with preservatives, on seasoning and on prevention of moisture penetration. Questions of resistance to wear and abrasion, combustibility, fire resistance and moisture content are dealt with and a classification is given of hardwoods and softwoods considered suitable for flooring. Information is included on types of sub-floors and base, and aid given in determining their suitability. A method of determining the dryness of a sub-floor or base is described and diagrams illustrate the apparatus for measuring dampness. Alternative methods of constructing solid floors subject to rising damp and methods of fixing types of timber flooring are described.

Sub-code 201.101, "Hardwood and Softwood Board and Strip Flooring," deals with materials for, and the laying of, hardwood and softwood in the forms of boarding, strip overlay and parquet, on timber sub-floors and on concrete subfloors having a nailable screed or timber fixing battens. It gives guidance on the preparation of the base to receive flooring, laying, surface treatment and maintenance.

Sub-code 201.103, "Plywood Flooring," deals with the laying of plywood as a flooring on timber sub-floors and on concrete sub-floors having timber fixing battens. Recommendations for the preparation of the base, laying the flooring and maintenance are included.

The code is subject to amendment. Comments should be submitted by January 5. Copies may be obtained from the B.S.I., 24-28, Victoria-street, S.W.1, price 5s., proof reference CP(B)804.

DIPLOMA FOR CLERKS OF WORKS

THE Association of Building Technicians intends to award a diploma to clerks of works who qualify to receive it. The object is to establish a status for clerks of works and to encourage them to improve their general theoretical knowledge by professional qualifications. The holding of the diploma will signify the attainment of recognised standards, and will help to ensure that only competent clerks of works will be employed.

Those who wish to obtain the diploma will be required to comply with the following conditions: (1) To have been for at least 10 years a skilled building operative, or to have had 10 years' experience as a supervisory technician. In either case five years must have been spent on the site; and (2) as a temporary concession applicants who have held the office of clerk of works or general foreman for at least 10 years will be exempt from all but the oral examination given by the Association of Building Technicians.

NEWS IN BRIEF

Scales for Valuation Surveyors.

In accordance with its policy to put forward salary scales for the various categories of its membership, the general council of the Association of Building Technicians recently instructed the executive committee to prepare scales for valuation surveyors. This has been done, and the basis taken was the scale now paid to such surveyors employed by the Inland Revenue.

Contractors Appoint Board Members.

Sir Harold Bellman, chairman and managing director of the Abbey National Building Society, has joined the board of Taylor Woodrow, Ltd., civil engineering and building contractors. He relinquishes his appointment as managing director of the Building Society on December 31, but remains chairman. Another member appointed to the board is Mr. Arthur Collins, who was a director of the company before the war.

Retirement of Director.

On his retirement from active business as a director of Trollope and Colls, Mr. C. C. Trollope has been elected an honorary member of the London Master Builders' Association. He was president of the L.M.B.A. in 1941, and has long played an active part in the L.M.B.A. and National Federation affairs. In recent years he has been a prominent member of the National Federation Contracts Committee, where his long experience of the building industry has been of particular value in negotiations with the Government and with the R.I.B.A.

Plaster and Plasterboard.

The production of hardwall plaster and plasterboard has now reached a level at which all demands can be met; the sale of these materials is no longer subject to the W.B.A. Priority Distribution Scheme, which was abolished on November 1. All economy measures which were imposed on the use of plasterboard in order to ensure that sufficient supplies were available to meet essential requirements, have been removed, and both hardwall plaster and plasterboard may be freely specified for all suitable purposes.

Wage Increase for Electricians.

The National Federated Electrical Association announce that the National Arbitration Tribunal has awarded a wage increase of 1d. per hour to journeymen electricians, and corresponding increases to all other classes of labour in the industry whose wages comprise a percentage of the journeyman electrician's rate.

In grade "A" area the hourly basic rate for journeymen electricians is now 2s. 5d.; the temporary hourly addition is 9d.; and the hourly inclusive rate is 3s. 2d.; corresponding figures for the Mersey district are 2s. 2½d.; 9d.; and 2s. 11½d.; and for the Grade "B" areas 2s. 1½d.; 9d.; and 2s. 10½d.

The Value of Overseas Contracts.

The Export Group for the Constructional Industries, which is representative of the Building and Civil Engineering Contractors carrying out contracts overseas, held a reception at the Dorchester Hotel on December 1. The chairman, Sir Henry Holloway, expressed regret that owing to unforeseen circumstances the President of the Board of Trade was unable to attend. Continuing, he said that it would be difficult to give an exact figure of the value of contracts now being undertaken by British contractors overseas, but it represented a substantial direct contribution to the problem of the balance of payments. Far greater perhaps were the indirect advantages which accrued to British export trade through the achievements of British contractors abroad.

Minister Praises President's Plan.

Mr. D. C. Burgess, president of the London Master Builders' Association, has received the following letter from Mr. George Isaacs, Minister of Labour and National Service, on the subject of his pamphlet "Two Sides or One Team?" "I do not think it is possible to overestimate the importance of the object you have in mind. Real co-operation between employer and employed is a vital necessity to industry in the circumstances of today. It should also bring great benefits to the worker in the happier and more harmonious working conditions which it will produce. I wish you every success in your efforts."

Evidence for the Working Party.

The National Federation of Building Trades Employers, which for the past three months has been collating the evidence it proposes to offer to the Working Party for the Building Industry in response to its questionnaire, expects to present it in the course of next month. At its recent council meetings the National Federation, in addition to discussing the views which building trades employers wish to put forward, invited all its regional federations to discuss the questionnaire and put forward their findings for incorporation in the National Federation case. These views are now being considered by a sub-committee of the National Federation Executive, consisting of the president, Mr. F. M. Sleeman, the senior vice-president, Mr. Norman Longley, who will be President when the National Federation appears before the Working Party, the senior vice-president for next year, Mr. R. O. Lloyd, the director, Mr. Stanley Hearder, and other senior officials.

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CRAWLEY NEW TOWN

CHAIRMAN PRESENTS PLAN

THE master plan for the new Crawley was presented on Saturday by SIR THOMAS BENNETT, chairman of the Crawley-Three Bridges New Town Development Corporation. This plan (the preliminary outline of which was described in *The Builder* of December 12, 1947) is for an area of nearly 6,000 acres and provides for the accommodation of nearly 50,000 people. Sir Thomas said that a large industrial area was planned for the north, near Gatwick, and to effect the pattern seven bridges and three underpasses were required.

The 95-acre town centre would include a 200-ft. wide boulevard 400 yards in length. This would be lined by public and educational buildings, while fountains, gardens and sculpture pieces would occupy the centre. To the south would lie the main shopping streets, with 40-ft. carriageways and 20-ft. wide footways planted with trees.

Factories for nearly 8,500 workers would be provided on the 264-acre industrial area. Nine residential neighbourhoods were planned. Population would vary from 4,000 to 7,600 and each would include a centre, school, shops, church and inns, grouped around a green.

Arrangements had been made to combine gas requirements with the needs of the area to the north as far as Croydon. Work on water, sewerage, electricity and other services was in hand.

Sir Thomas went on to say that the Ministry of Civil Aviation had served notices terminating the present occupation of Gatwick airport, but it was hoped that some arrangement might be made for Gatwick to serve the new Crawley.

For some years the new town would not be able to show a profit. Eventually, the corporation hoped to prove they had earned their keep by turning over to an urban district council what Parliament would consider a national asset.

PRESENTATION OF BUILDING DATA

AN AMERICAN COMPETITION

THE technical handbooks, pamphlets and catalogues issued by manufacturers of building materials in the U.S. will be entered in a new competition sponsored by the American Institute of Architects and the Producers' Council. The competition is designed to improve the quality of presentation of information about building materials and is a major objective of the affiliation programme of the A.I.A. with the Producers' Council. The contest will be judged by a jury composed of architects, manufacturers and advertising executives. The period of competition has run through 1948 and the selection of the winners will be made next year. Each Chapter of the American Institute of Architects has appointed a representative who collaborates with the A.I.A.'s Department of Education and Research in selecting literature on building materials considered worthy of competition. It is planned to make the contest an annual event.

Excluded from the competition will be the conventional display advertising about building materials which appears in publications of a general nature. The architects and other judges on the jury, so we understand, will look for complete and accurate presentations of building products and interesting methods of approach in the detailed handbooks, pamphlets and catalogues of a manufacturer.

TRADE NEWS

Paints and Varnishes.

A booklet issued by Drynamels, Ltd., Shaftmoor-lane, Hall Green, Birmingham, gives details of the firm's product which comprise industrial, agricultural and marine paints and varnishes.

Composition Flooring for Flats.

Among several schemes for housing authorities in London on which Semtex, Ltd., are laying their "Fleximer" composition floors are two blocks of 40 flats each, now being built for the Lambeth Borough Council in Denmark-road, to plans by Mr. G. Grey Wornum, F.R.I.B.A., the builders being Messrs. F. and H. F. Higgs, Ltd. A total of about 3,000 square yards is being laid with this composition which, we are informed, has been accepted by the Ministry of Works as a suitable substitute for all timber floors. "Fleximer" composition is floated on to the concrete in a cold plastic state to the thickness of ¼ in. The result is to give a covering which is resilient, warm to walk on, and water and vermin-proof, besides being easy to maintain. The composition is obtainable in several shades. Details are obtainable from 185-189, Finchley-road, N.W.3.

The New Thames Wall.

Following the announcement in our issue of November 26, of the placing of an order for granite for the new river wall on the south bank of the Thames, Messrs. Cooper, Wettern and Co., Ltd. have informed us that the order has been placed in their hands. It will be executed from the quarries of Messrs. John Freeman and McLeod, Ltd., and other quarries in Cornwall. The quarrying and dressing of the stones has been in hand for several weeks. The firm has, in the past, supplied dressed granite for the L.C.C. contracts, including that for New Lambeth Bridge (approximately 90,000 cu. ft.), the widening of Putney Bridge (approximately 112,000 cu. ft.), and New Chelsea Bridge (approximately 40,000 cu. ft.). The order for the new river wall is the first large contract requiring dressed granite since the war and will, doubtless, prove of value in developing the Cornish granite industry after a long period of depression.

Two New Compressors.

The ever-increasing use of compressed air in practically every branch of industry calls for new machines and up-to-date equipment in order to fulfil modern requirements. It is with this object that two newly-designed air compressors have recently become available which are especially suitable for the building and decorating industry. One model is a heavy-duty mobile unit, weighing approximately 3¼ cwt., and mounted on pneumatic-tyred wheels. The electrically-welded receiver, 12 in. dia. by 24 in. long, carries the compressor and motor on a detachable saddle. The compressor is identical with a type of which thousands were produced during the war for Government Departments and has thus proved its quality by experience under varying conditions. The motive power is provided by a 2 h.p. 4-stroke engine. An electrically-driven version of the above model is also available. The other new model is a small portable compressor ideal for the decorator who wishes to transport it from job to job; it can be easily carried to and from a private car. Both models are designed and manufactured by H.E.C. Compressors and Engines, Ltd., Levis Works, Stechford, Birmingham, 9, who will supply details on request.

CONTROL OF ENGAGEMENT

OPERATION EXTENDED

After consultation with the National Joint Advisory Council and the Women's Consultative Committee, the Minister of Labour and National Service has decided to extend the operation of the Control of Engagement Order, 1947, from January 1, 1949, when it would have expired, to January 1, 1950. This is effected by the Control of Engagement (Amendment) Order, 1948,* which was made by the Minister on December 1, 1948, and which comes into operation on December 15, 1948.

The Control of Engagement Orders, 1947 and 1948, require engagements for employment to be made, with certain exceptions, through local offices of the Ministry of Labour and National Service, or approved employment agencies.

*S.I., 1948, No. 2608. H.M. Stationery Office, York House, Kingsway, W.C.2, price 2d., post free.

THE SCOTTISH BUILDER

NEW BUILDINGS

Glasgow.—Alterations and additions proposed for the Rivet, Bolt and Nut Co., Ltd., at Helen-st., for which the architect is John Galt, 59, Bath-st., Glasgow.—Extensions, etc., proposed at Netherton Works for Ioco, Ltd., Anniesland, for which the architect is John C. Busby, 7, Kirk-cres., Old Kilpatrick.

Glasgow.—Harland & Wolff, Ltd., Govan, to erect new buildings at Balmoral-st.—Brownlee & Co., Ltd., Craighall-rd., Glasgow, have a £100,000 scheme in hand for the erection of new offices and new workshops.—The West of Scotland and Glasgow Commercial College, West George-st., have plans in hand for large extension, etc., at Crookston-rd.

Glasgow.—Plans in hand for new canteen and other buildings at Amulree-st., for which the architects are the Corporation Housing Staff.—Additions and alterations, etc., to be made at St. Convals elementary school, Shawhill-st., and also at St. Convals infants' school, for which the architect is John MacNab, 129, Bath-st., Glasgow.

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(2) Increases in Labour Rates and percentage increases for the above five years together with the Wages Increase and Bonus Incentive introduced in Oct., 1947.

(3) Average relative proportion of each trade to a complete building operation, with ratios of Labour to Material in each Trade and approximate percentage increases for the respective years, 1937-1946.

(4) Percentage Cost of Building Work as at 1914 compared with the years 1920-1946.

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FUTURE CONSTRUCTION

PUBLIC APPOINTMENTS

Full details of Public Appointments open will be found in the Advertisement pages of this and previous issues.

CONTRACTS OPEN

For some contracts still open but not included in this list see previous issues. Those with an asterisk are advertised in this number. The dates at the heads of paragraphs are those for the submission of tenders; a dagger (†) denotes closing date for applications; the name and address at the end refer to the person from whom particulars may be obtained.

BUILDING

DECEMBER 17.

***†Derby C.B.**—Hospital workers' canteen at City Hospital, Uttoxeter-rd., on behalf of Sheffield Regional Hospital Board. T.W. East (F.), Boro' A. Dep. £2 2s. Send-in date January 14.

***†Newcastle-upon-Tyne E.C.**—(a) Conversion of private dwelling house at Elmfield-rd. into hostel, and (b) erection of workshops at Northumberland-rd. for Rutherford College of Technology. G. Kenyon, City A., 31, Northumberland-rd. Dep. (a) £1 1s., and (b) £2 2s. Tenders by January 15.

DECEMBER 18.

***†Essex C.C.**—Internal renovations at Stisted Hall Hostel. H. Conolly (F.), County A., County Hall.

DECEMBER 19.

***†Ches. C.C.**—Police houses at various sites. County A., The Castle, Chester. Dep. £2 2s.

DECEMBER 20.

***†Denbighshire C.C.**—Police houses and office at 3 sites. Gilbert D. Wiles, County A., Grove Park, Wrexham. Dep. £3 3s. each house.

Henley R.D.C.—60 houses at 5 sites. C., 12, Hart-st. Dep. £3 3s.

***†Newton Abbot U.D.C.**—108 houses at Buckland estate. S., 18, Devon-sq. Dep. £5 5s.

***Southampton C.B.**—10 houses at Beechwood estate, Midanbury, and 84 at Harefield estate, West End. Boro' A., Civic Centre. Dep. £2. Tenders by January 10.

***†Tottenham B.C.**—Block of 4 dwellings at Chalgrove-rd. Rees J. Williams, A.M.Inst.C.E., B.E. & S. Dep. £2 2s.

DECEMBER 21.

Carlton U.D.C.—44 houses and 14 bungalows at Southcliffe housing site (No. 11). J. R. Campbell, A.M.I.Mun.E., E. & S., Council House, Burton-rd. Dep. £5 5s.

DECEMBER 22.

Canvey Island U.D.C.—Six pairs of houses at Long-rd. Cockrill & Fowles, 35, Weston-chbrs., Southend-on-Sea. Dep. £2 2s.

DECEMBER 23.

***Isle of Wight C.C.**—Erection of West Wight Youth Centre on site of Freshwater Secondary Modern School. F. H. Booth (A.), A.M.T.P.I., County A., County Hall, Newport, I. of W. Dep. £2 2s. Tenders by January 17.

***†Tettenhall U.D.C.**—84 houses in 2 contracts at Woodhouse estate. J. W. Mason, M.I.Mun.E., E. & S., Council Offices. Dep. £3 3s.

DECEMBER 27.

Hiraethog R.D.C.—12 houses at 2 parishes. J. Roberts, C., "Avondale," Llanwrst, Denbighshire. Dep. £3 3s.

Roxburgh C.C.—(a) 20 houses at 4 sites; (b) roads and sewers, etc., at 7 sites. Architect, County Offices, Newtown St. Boswells.

DECEMBER 29.

Saltash T.C.—Two blocks of 4 Duplex flats at Cowdray site, St. Stephen's-rd. B.S. Dep. £5 5s.

South Molton R.D.C.—Two pairs of houses at Molland with paths, drains, etc. A. G. Oxland, architect, 6, East-st., South Molton, N. Devon. Dep. £2 2s.

DECEMBER 30.

***Newcastle-upon-Tyne Regional Hospital Board.**—Extensions to "J. H. Rodger" ward at Newcastle General Hospital. City A., 18, Cloth Market.

Warsop U.D.C.—23 dwellings with paths, drainage, etc., at Stonebridge-la. A. H. Coupe, C., Town Hall. Dep. £2 2s.

DECEMBER 31.

***Bournemouth C.B.**—25 houses at High Howe-cl. Boro' A. (Room 51). Dep. £2 2s.

***†Southampton C.B.**—New Junior and Infants' School at Weston-la. Boro' A., Civic Centre. Dep. £2 2s. Tenders by February 7.

***†West Sussex C.C.**—(1) Two dining-rooms at Lancastrian Secondary Schools, Chichester; (2) canteen kitchen and dining-room at North Lancing Council School; (3) canteen kitchen and dining-room at Council School, Sidlesham; (4) canteen kitchen and dining-room at C.E. School, Slinfold. County A., County Hall, Chichester.

Wokingham R.D.C.—14 houses and 5 bungalows at Bull-la., Swallowfield. Eric G. V. Hives (L.), 3, Cork-st., Reading. Dep. £2 2s.

JANUARY 1.

Ramsey (Hunts) U.D.C.—Eight houses at Ashbeach-rd. site, Ramsey St. Marys. V. J. Bateman, architect, Whytefield-rd., Ramsey. Dep. £2 2s.

JANUARY 3.

Chatham T.C.—10 pairs of houses at Wayfield estate. H. D. Peake, B.E. & S., Town Hall. Dep. £2 2s.

***Chesterfield R.D.C.**—14 houses, Rotherham-rd., Killmarsh. J. B. Wikeley, E. & S. Dep. £2 2s.

***Chippenham T.C.**—62 houses on Greenway-la. site. B.E., 10, Market-pl. Dep. £5 5s.

†***Lincoln (Parts of Kesteven) C.C.**—Pair of police houses at Dysart-rd., Grantham. C. B. Metcalfe (F.), County A., County Offices, Sleaford. Tenders by January 17.

***Mansfield T.C.**—28 houses at Bancroft-la. estate. B.E. & S., Carr Bank. Dep. £2 2s.

JANUARY 6.

***Ealing.**—32 flats and 12 old peoples' dwellings at South-East Northolt. C. W. Seddon, B.E. Dep. £5 5s.

JANUARY 8.

Chapel-en-le-Frith R.D.C.—14 houses at Hayfield and 8 at Dove Holes. Pendleton & Dickenson, architects, 16, Brazennose-st., Manchester 2. Dep. £2 2s.

***Hertford R.D.C.**—Eight houses at "Foxdells," Birch Green. C., 20, Castle-st. Dep. £3.

JANUARY 11.

***Salop C.C.**—(a) Second instalment of New Primary School at Shrewsbury; (b) erection of Dawley St. Leonard's Primary School; (c) alterations to communal block at hutted camp, Atcham, for primary school accommodation. A. G. Chant, County A., 5, Belmont, Shrewsbury.

JANUARY 12.

Beds C.C.—Removal of existing bridge and reconstruction of reinforced concrete bridge at Leighton Buzzard. County S., Shire Hall. Dep. £5.

***Salford T.C.**—Six shops and maisonettes, Wardleworth housing estate, Eccles Old-rd. C.E. Dep. £2 2s.

JANUARY 13.

***Bucks Standing Joint Committee.**—Police houses at 3 sites. County A., County Offices, Aylesbury. Dep. £2 2s.

JANUARY 15.

***Prestwich T.C.**—24 dwellings at Carr Clough housing scheme. B.E. & S., Town Hall. Dep. £3 3s.

JANUARY 20.

***Salford T.C.**—Erection of Open-air School at Claremont Farm site. City E., Town Hall. Dep. £3 3s.

JANUARY 25.

Tralee (Co. Kerry) U.D.C.—252 houses and site works at Gallows Fields. C. T. Kennedy, C., Council-chbrs., Tralee. Dep. £10.

PAINTING, ELECTRIC LIGHTING, MATERIALS, ETC.

JANUARY 8.

Bexley T.C.—B.E. (Materials).

JANUARY 15.

Malden and Coombe T.C.—B.E. (Materials).

JANUARY 17.

Hereford T.C.—B.S. & E. (Materials).

ROADS, SEWERAGE AND WATER WORKS

DECEMBER 20.

Brentford and Chiswick T.C.—Roads and drainage works at St. Thomas's site. Dep. £2 2s.

DECEMBER 22.

Ealing T.C.—Making-up 4 streets. B.E. & S. Dep. £2 each street.

DECEMBER 28.

†***Ludlow R.D.C.**—Advance preparation of Clee Hill housing site. W. B. Bond, quantity surveyor, Colmore-chbrs., 3, Newhall-st., Birmingham 3. Dep. £2 2s.

DECEMBER 29.

Worcester T.C.—Roads and sewers at Newtown (No. 2) estate. City E., 22, Bridge-st. Dep. £5 5s.

DECEMBER 31.

Acton T.C.—320 yds. of 15-in. stoneware sewer at Lynton-rd. B.E.

JANUARY 1.

Horsham R.D.C.—Sewer and sewage disposal works at Adversane. S., Comewell House, North-st.

JANUARY 3.

Bognor Regis U.D.C.—Roads and sewers at Hampshire-ave. recreation ground. E. & S., Town Hall. Dep. £2 2s.

Deigelly R.D.C.—Laying of asbestos cement pipes and construction of reservoir at Llanymawddwy. Wallace Evans & Partners, 13, Victoria-rd., Penarth, Glam. Dep. £5

JANUARY 4.

Halifax C.B.—3,600 yds. of 20-in. dia. cast-iron water main. Waterworks E. & Manager, Gibbet Hill. Dep. £2 2s.

Truro R.D.C.—Cast-iron water mains, etc., at St. Michael Penkevil. G. Osmand, A.M.I.C.E., 3, St. George's-rd., Newquay. Dep. £2 2s.

JANUARY 12.

St. Thomas R.D.C.—9,100 lin. yds. of 6-in., 4-in. and 3-in. dia. spun-iron water mains, etc., at Exminster. Ross, Hooper & Harvey, 38, Market-pl., Chippenham. Dep. £1.

Wilmslow U.D.C.—1½ miles of steel sewers. Contract No. 4. G. B. Kershaw and Kaufman, 1, Victoria-st., S.W.1. Dep. £5 5s.

JANUARY 14.

Poole T.C.—Relief soil sewer at Penn Hill. B.E. & S. Dep. £2 2s.

Petworth R.D.C.—Sewage disposal works and laying of stoneware and cast-iron pipe sewers, etc. E., Newlands, Petworth. Dep. £2 2s.

GENERAL BUILDING WORK

(LONDON)

Bushey.—HOUSES.—B.C. to erect 26 houses at Clay-la., subject to ministerial approval.

Finsbury.—HOUSING.—B.C. making compulsory purchase order for sites in Old-st., Central-st., Gee-st., and Ludlow-st.

Fulham.—TEMP. HOUSES.—B.C. to acquire 1-17 (odd), Bagley's-la.; 12a, Favart-rd.; 17, Favart-rd.

Islington. — FLATS. — B.C. seeking L.C.C. approval to build 66 flats at Sparsholt-rd. extension at £122,516. Architect, H. C. H. Monson (F.), 120, Moorgate, E.C.2.

Norwood.—PUBLIC HALL AND LIBRARY.—Lambeth B.C. seeking L.C.C. approval to development of 1-7, Norwood High-st. as public hall and library.

Plumstead.—TEMP. HOUSES.—Woolwich B.C. to acquire 14, 20, 22, Minesal-st. and 9, Woodhurst-rd.

Woolwich.—TEMP HOUSES.—B.C. to acquire 14 16, 20-28 (even), Jackson-st. for temp. houses.

(PROVINCIAL)

Ashton-in-Makerfield.—U.D.C. approved s.d. houses, Liverpool-rd., Pewfall, George Dixon, builder, 5, Lynton-rd., Hillside.—U.D.C. propose improvements to public hall.—U.D.C. received sanction of M.H. to borrow £46,000 for 36 houses by contract and £32,000 for 26 houses by direct labour at Bryn Station site.

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Ashton-under-Lyne.—Lancs C.C. propose police houses at Ney-st., Waterloo.

Bakewell.—R.D.C. propose houses at Rowsley.

Bethesda.—U.D.C. propose 30 houses at Llwynnbleddyn and 30 at Glanogwen.

Blackpool.—Clifton Constructions (Blackpool), Ltd., Clifton-rd., Marton, propose 44 houses at Grange Park estate.

Boldon.—U.D.C. received sanction to build 44 houses at Boldon Colliery and 38 at Cleadon-la. Plans by S., Council Offices, East Boldon.

Bridgwater.—T.C. recommend that 1949 housing programme should be allocated as follows: Burtle, 4; Cannington, 4; Chedzoy, 8; Chilton Trinity, 4; Fiddington, 2; North Newton, 4; North Petherton, 16; Nether Stowey, 10; Othery, 6; Puriton, 8; Spaxton, 4; Sutton Mallett, 2; Wembdon, 4.

Bristol.—City C. to build 400 Cornish unit houses by next summer.

Caernarvon.—R. Lloyd Jones & Co., Ltd., general merchants, South Penralt, propose rebuilding Nelson Emporium.

Cheadle Hulme.—Ches. C.C. propose alterations to Hulme Hall for conversion into residential hostel for aged people.

Chester.—T.C. propose adaptation and equipment of Hough Green Hotel for hostel for aged people.

Chorley.—R.D.C. propose 85 houses at Croston, Buxton and other sites and 25 by private enterprise.

Clitheroe.—West Riding E.C. propose sec. county sch. at Bolton-by-Bowland.

Easington (Durham).—R.D.C. propose shops and business premises at each of 8 housing sites. Plans by B.E., C. W. Clarke, Council Offices.

Eastbourne.—T.C. to apply to M.H. for authority to build 40 private enterprise houses; 25 cost of works houses; 120 council houses at Chatfield-Davis estate; and 15 elsewhere, in 1949.

Elstree.—M.H. confirmed compulsory purchase order by R.D.C. for land at Shenley for erection of 50 houses.

Hetton (Co. Durham).—U.D.C. planning erection of community centre at £20,000-£25,000.

Heywood.—T.C. approved 26 s.d. houses at site off Broadfield st. A. Openshaw & Sons, builders, 1, Duke-st.

Huddersfield.—T.C. to permit private builders to erect up to 36 houses.

Hull.—Moss Empires, Ltd., Cranbourne-mans., W.C.2, propose alterations to Palace Theatre, Anlaby-rd. E. M. Lawson (A.), architect, Barras-bldgs., Newcastle-on-Tyne 1. (Estimated cost £11,802.)

Ilkley.—West Riding C.C. propose grammar sch. at £257,200. H. Bennett (F.), County A., County Hall, Wakefield.

Ingleton.—West Riding C.C. propose police housing site near Hollin Tree.

Jarrow.—T.C. to build flats at Albion-st. area. Plans by the B.S., H. Perkins, Town Hall.

Keighley.—T.C. approved houses, Skipton-rd., Utley, Ernest Turner, builder, Bradford-st.

Keighley.—E.C. propose extensions to girls' grammar sch. at £17,430. E. G. Felgate (A.), Boro' A., 26, College-st.

Kidderminster.—Worcs. C.C. propose welfare centre and clinic at Coventry-st. council sch. L. C. Lomas (F.), County A., 60, The Tything, Worcester.

Lancashire.—C.C. propose police houses at Peakdale-rd., Droylsden.

Leeds.—City C. to build 400 houses.

Littleborough.—U.D.C. propose 36 houses.

Liverpool.—City C. approved erection of 90 dwellings at land bounded by Gregson, Westbourne, Kinder and Alma-sts.; 81 at land bounded by Alt-st., Tiber-st., Kingsley-rd.; 190 at land north-west of Park-la., St. James-st.; 24 at site between Grenville-st. South and Hardy-st.; 39 between Netherfield-rd., Mark-st. and Devonshire-pl.; 190 at Beaumont-st. area. City C. to acquire sites (1) between Burlington-st., Wellington-st., Scotland-rd. and Limekiln-la.; and (2) between Rachel, Collingwood, Great Homer and Cazneau-sts.

Longton.—Rev. A. P. Keating, P.P. of St. Oswald's, Chapel-la., propose new sch. at £7,000.

Manchester.—T.C. approved:—Rebuilding 3-storey building for factory, John-st., Strangeways, for Leon David & Co., Ltd. (Pendleton & Dickinson (L.), architects, 16, Brazennose-st.); warehouse, 130, Stockport-rd, Longsight, for New Day Furnishing Co., Ltd. (architect, F. Needham, 59, Upper Chorlton-rd.); rebuilding, etc., 26-28, Whittle-st., and Oak-st., Shudehill, for E. Morrison (F. Jones & Son (F.), architects, 178, Oxford-rd., Chorlton-upon-Medlock).—Right Rev. H. V. Marshall proposes new R.C. prim. sch. at Newell Green, Wythenshawe.—T.C. propose adaptations to Woodlawn, Fielden Park, West Didsbury, for residential home for aged people.—Cttee. of Manchester and Salford Council of Social Service propose adaptations to buildings for 2 residential hostels for aged people.

Middlesbrough.—E.C. to erect 3 schls. in 1949. Plans by Ed. Arch., Woodlands-rd.

Middlesbrough.—T.C. to build 48 houses at Therntree estate. B.S., J. Kenyon.

Newark.—T.C. to receive allocation of 256 houses in 1949; 50 for private enterprise.

Newcastle-on-Tyne.—E.C.'s 1949 programme includes Blakelaw Blackett Ord. V.P. sch., Blakelaw S.M. sch., and Montagu C.P. sch. Ed. Arch.'s Dept. is at 31, Northumberland-rd.

Newcastle (Staffs).—T.C. approved houses and garages, Whitmore-rd., for Hudson & Oakley (Hulme & Upright, architects).—T.C. propose 46 houses at Bradwell Estate. C. B. Parkes (L.), architect, Estate Office, Bournville Village Trust, King's Norton, Birmingham 30.

Northumberland.—Ed. Cttee. to purchase compulsorily 15 acres at Wooler for sec. sch. C.A., W. W. Tasker, County Hall, Newcastle.

Otley.—U.D.C. propose 50 prefab. permanent houses at Weston-la. site.—Rev. T. Donovan, P.P. Church of Our Lady and All Saints, propose new sch. at Bridge-st.

Peterlee (Co. Durham).—Peterlee Development Corp., Shotton, to erect 100 houses at south-east corner of proposed town near Horden.

Rhyl.—U.D.C. approved £9,500 scheme for reconstruction of open-air swimming pool.

Rotherham.—T.C. propose central bus station.

Scarborough.—T.C. to spend £12,000 improving T.C. cafés. H. V. Overfield, B.E.

Southport.—T.C. to purchase housing sites at Balmoral-dr. and Heathfield-rd., subject to M.H. approval.—T.C. approved lay-out plan submitted by Glen Park estate for housing at Mere Park-dr.

South Shields.—B.E. to prepare plans for erection of two hostels for old people for T.C. E.C. received sanction to borrow £119,815 for erection of the Harton Downhill and Marsden-rd. County Infants' School. T.C. applied to borrow following sums: £90,700 for erection of 78 houses; £10,000 for erection of 8 houses; £61,500 for erection of 50 houses; £12,681 for erection of 6 shops and flats; £76,095 for erection of 62 houses. Howard Hill, Winchester-st., South Shields, prepared plans for J. Woolgar, builder, for 4 bungalows at Moor-la. East and 6 houses at Marsden-rd.

Stockport.—T.C. approved alterations to works at Gorton-rd. for Reddish Chemical Co., Ltd.; extensions to works at York-st. for H. Lee.

Stockton-on-Tees. — Stockton Co-op. Soc., Wellington-st., planning erection of dairy and ice-cream factory at £150,000. Plans by C.W.S. Arch. Dept., 90, Westmorland-rd., Newcastle-on-Tyne.

Sunderland.—T.C. to build 1,000 houses in 1949 to plans by J. E. Lewis, B.E., 27, Fawcett-st.

Tamworth.—T.C. propose 34 houses on Fazeley-rd.

Thornaby-on-Tees.—Plans approved for addition to factory at Mandale-rd. for W. & M. Pumphrey, Ltd. Architects, Kitching & Co., 21, Albert-rd., Middlesbrough.

Tiverton.—R.D.C. to divide 1949 building allocation between private enterprise (7), Bradnich (10), Thorverton (6), and Willand (12).

Tynemouth.—T.C. is considering erection of houses for members of fire brigade. T.C. proposes 14 shops and flats at West Chirton estate and 8 shops and flats at Broadway estate. E.C. asked M.E. to approve erection of Marden-ave. Infants' sch. Rutherford Bros., fish merchants, North Shields, to spend £6,000 on erection of premises at Cliffords Fort Moat.

West Bromwich.—T.C. propose 9 shops and flats and blocks of flats at Harvils Hawthorne No. 1 site and Florence-st. Simms & Gifford (L. & A.), architects, 323, High-st.—E.C. propose completion of Kenwrick tech. sch. T. Spencer Wood (F.), architect, 57, Colmore-row, Birmingham 3.

West Riding.—Ed. Cttee. to build schools for Sheffield at £1,500,000.

Wirksworth.—Trent Motor Traction Co., Ltd., Uttoxeter New-rd., Derby, propose central omnibus station at Canterbury-rd.

York.—Col. J. H. Smith proposes rebuilding 7 and 7a, Blake-st., after war damage. Ward, Porteous & Ruddick (F/F.), architects, 9, Museum-st.

TENDERS

* Denotes *accepted*.
† Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modification*.
¶ Denotes *accepted by H.M. Government departments*.

Ashby-de-la-Zouch.—Ten houses at Heather, for R.D.C. V. G. Bott, A.I.A.A., Council Offices: *T. F. Chapman & Co., Ltd., 33, Humberstone-rd., Leicester (subject to M.H. approval).

Ashby-de-la-Zouch.—Six houses at Ravenstone, for R.D.C. V. G. Bott, A.I.A.A.: *J. G. Lidwell, Warrington (subject to M.H. approval).

Barton-upon-Humber.—16 houses at Tofts-rd. estate for U.D.C. Fisher & Hollingsworth, architects, 23, Lowgate, Hull. *H. D. Foster, 103, West Acridge, Barton-upon-Humber, £19,680 (subject to M.H. approval).

Belfast.—96 houses at Parkmount estate, for T.C.: *T. & J. Whiteside, Ltd., Belfast.

Birkenhead.—30 three-storey flats at St. James'-gdns., for B.C.: *Lloyd & Cross, Ltd., Birkenhead, £35,900.

Blackpool.—82 houses at Grange Park estate, for T.C. Arthur Hamilton, B.Sc., B.S.: *R. Fielding & Sons, Stanhope-rd. Works, Blackpool.

Brighton.—34 houses, Group I, Section 5C; 26 houses, Group 2, Section 5D, for C.B. B.E. & S., 26-30, King's-rd. *Rice & Son, Ltd., 3, Palace-pl., Brighton. £86,594.

Caernarvon.—48 houses at Maes Barcer estate, for T.C. W. Rees Davies, A.M.Inst.C.E., Guild Hall: *Williams & Williams, Caernarvon, £72,664.

Camden Town.—Reconstruction of Cupar Cottage, Wilkin-st. Daydon Griffiths (F.), 12, Nottingham-pl., W.1: *E. H. Bowles, Ltd., 10, Highgate High-st., London, N.6.

Canterbury.—54 houses at Spring-la. site, for City Council. L. Hugh Wilson (A.), A.M.T.P.I., City A., Municipal-bldgs., Dane John. Quantities by Widnell & Trollope, Broadway-court, Broadway, S.W.1: 7 pairs type 3A3, 13 pairs type 3C2, *K. A. Hawkes, Ltd., "St. Margaret's," Minnis-rd., Birchington, Kent, £48,891; 7 pairs type 3C3, *H. Goodsell, 23, Watling-st., Canterbury, Kent, £17,747.

Canterbury.—40 houses at Spring-la. housing site, for City Council. L. Hugh Wilson (A.), A.M.T.P.I., City A., Municipal-bldgs., Dane John. Quantities by Widnell & Trollope, Broadway-court, Broadway, S.W.1: *G. Lewis & Sons (Dover), Ltd., Widred-rd., Dover, Kent, £49,924.

Chesterfield.—Extensions at William Rhodes Secondary school, for E.C. Wilcockson & Cutts, architects, 12, Saltergate: *Adam Eastwood & Sons, Ltd., Burns-la., Warsop, Mansfield, £29,301.

Clayton-le-Moors.—40 houses at Field Bottoms estate, for U.D.C. Frank Bradley (A.), District Bank-chbrs., Wood-st., Bolton: *Andertons, Beech House, Stanfield-rd., Forton, Preston, £49,134.

Coventry.—200 houses for T.C. D. E. E. Gibson, M.A. (F.), City A., 1a, Warwick-row: *J. K. Mousell, Ltd., Blondvil-st. (24); *H. Clark & Son, Coronation-st. (22); *H. Darbyshire & Son, Burnall-rd. (18); *F. Hockling, Wyke-rd. (16); *Hobley Bros., Woodside-av. (14); James & Edwards, 141, Spon-st. (14); *J. Daniels, Russell-st. (12); *Matts & Son, Vacqueray-st. (12); *F. Bradley & Son, Wyken-st. (10); *J. Booth, Ltd., Tennyson-rd. (10); *C. Pritchard, 64, Ravensdale-rd., Walsgrave-on-Sowe (10); *A. Friswell, Wyken Croft (10); *H. Evans, Friswell-rd. (10); *C. P. Jones, Latham-rd. (10); *C. Anelay & Son, Catherine-st. (8). (All of Coventry.)

Crewe.—Club and concert hall buildings at Gresty-rd., for Committee of L.M.S. Railway Sports and Welfare Institute. F. Tomkinson, architect, 180, Edleston-rd.: *J. T. Gresty & Sons, Willaston, nr. Crewe (estimated cost, £18,000).

Doncaster.—Extensions at Doncaster Royal Infirmary, Thorne-rd., for Regional Hospitals Management Committee. W. A. Pite, Son & Fairweather (FF.), 6, Queen Anne's-gate, St. James', London, S.W.1: *T. Jenkinson & Sons (Doncaster), Ltd., Bentley-rd., Doncaster.

Eastbourne.—24 houses at Chatfield-Davis estate, for T.C.: *J. W. Ridge, Ltd., £32,922.

Gravesend.—50 dwellings at Christian Fields-

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av., nr. King's Farm, for T.C. J. Garrett Bennett (F.), Boro' A., Woodville-ter.: *F. Parham, Ltd., Eva-rd., Gillingham, £56,112.

Kent.—Conversion of existing property at Sundridge into flats. Daydon Griffiths (F.), 12, Nottingham-pl., W.1: *Durtnell & Sons, Ltd., Brasted, Kent.

Leek.—16 houses off Leek-rd., Baddeley Green, for R.D.C. Forshaw & Greaves (A.), 33, Albion-st., Hanley, Stoke-on-Trent: *G. Minshall & Co., Ltd., 292, Waterloo-rd., Cobridge, Stoke-on-Trent, £25,465.

Llandilo.—16 houses at Bontllwyn, for R.D.C. Norman E. Evans, M.I.Mun.E., M.I.S.E., M.R.San.I., E. & S., Council Offices, Crescent-rd. *Edwards Bros., Penybank, Ammanford, £20,963 (subject to approval).

L.C.C.—Contracts exceeding £2,500 in value placed by L.C.C. during period ended December 2:—Remodelling of kitchen and erection of a dining hut at Merton-rd. school, Putney, M. Howard (Mitcham), Ltd., Mitcham. Completion of refectory, heating chamber and fuel store, etc., at Paddington Technical College, Rogerson & Co. (Builders), Ltd., W.C.1. Reconstruction after war damage of Portobello-rd. school, Kensington, A. R. Coles (Contractors), Ltd., Bayswater. Electrical installation at Eardley-rd. school, Streatham, R. J. Kemp & Co., Ltd., Coalville, Leicester. Repairs after war damage at Aske's Hatcham Girls' School, Deptford, A. J. Dunning & Sons (Weyhill), Ltd., Woolwich. Electrical installation at the Colville School, Kensington, Iverson Electrical, Ltd., Kilburn.

¶London (Air Ministry).—Contracts to value of £500 or over for week ended December 4:—*Painting work*: The Industrial and Decorative Arts Co., Mansfield, Notts; C. A. Hayes & Sons, Ltd., Bristol 8; Chisholm Decorators, Ltd., Glasgow, C.3. *Building work*: Thomas Lowe & Sons, Ltd., London, W.6.

¶London (M.O.W.).—Contracts placed by M.O.W. during week ended November 27:—*London*: Imperial Institute, Kensington, External painting, Sykes & Son, Ltd., 10, Essex-st., W.C.2; 14-17, York-rd., Battersea, Alterations for new branch post office, J. Carmichael (Contrs.), Ltd., 331, Trinity-rd., Wandsworth. *Ches*: St. Thomas R.C. School, Wythenshawe, Hutted accommodation, Daniel Eadie & Co., Ltd., Short-st., Heaton Norris, Stockport; North Reddish Secondary School, Stockport, Hutted accommodation, Daniel Eadie & Co., Ltd., Short-st., Heaton Norris, Stockport. *Durham*: County School, Edmondsley, Classrooms, Wright & Kellett, Ltd., 14, Ashley-ter., Chester-le-Street. *Essex*: Chase-la. County Prim. School, Chingford, School kitchen and dining-room, W. J. Cearns, Ltd., Carpenters-rd., Stratford, E.15. *Glam*: Danycraig Boys' School, Swansea, Temp. school building, Griffith Davies & Co., Ltd., Paxton Yard, Swansea, Glam. *Glouc*s: Charborough-rd. school, Filton, Bristol, Temp. school building, W. G. Fisher & Sons (Bristol), Ltd., Park-pl., Bristol. *Hampshire*: National Gas Turbine Establishment, Pyestock, Erection and extension of heavy fuel oil installation, James Longley & Co., Ltd., Crawley, Sussex; West End Telephone Exchange, Southampton, Alterations and additions, Rice & Son, 61, Millbrook-rd., Southampton. *Lancs*: Aughton-st., Ormskirk, Telephone Exchange, James Tomkinson & Co., Ltd., 22, Roscommon-rd., Liverpool 5; St. Oswalds C.E. School, Collyhurst, Manchester, Hutted accommodation, P. Hamer, Ltd., Park-st., Swinton; Lower-pl. School, Rochdale, School kitchen and dining-room, T. E. S. S. Smith, Healy Hall Mill, Rochdale; Telephone Buildings, York-st., Manchester, Ext. and int. painting and cleaning, John Embledon & Sons, 90, Oxford-st., Manchester; Robin Hill Secondary School, Oldham, Hutted accommodation, P. Hamer, Ltd., Park-st., Swinton.

Lincs: Carlton-rd. School, Boston, Kitchen and dining-room, Wm. Wright & Son (Lincoln), Ltd., 45, Main Ridge, Boston, Lincs. *Middx*: Bush Hill Park School, Enfield, Temp. school bldgs., Parsons Bros. & Jennings, Ltd., 314, High-st., Tottenham, N.15. *Montgomeryshire*: Forestry Commission, Tyn-Yr-Wtra, nr. Llanidloes, Housing, Simon Jones, Ltd., 10, Beatrice-st., Oswestry. *Morayshire*: Rothes J.S. School, Temp. classrooms, The Scottish Tarmacadam & Asphalte Co., Ltd., 44-52, Bilbao-st., Glasgow. *Notts*: Arno Vale School, Arnold, Notts, Kitchen, scullery and dining-room, J. W. Stamp & Co., Nuthall-rd.; Bobbers Mill, Nottingham. *Staffs*: E.V.W. Hostel, Pendeford Farm, Codsall, Alterations and adaptations on drainage scheme and pump house, Thos. Payne & Sons, Ltd., 31, Churchfield-st., Dudley. *Stirlingshire*: Denny P. School, Stirling, School classrooms, Duncan Stewart (Bonnybridge), Ltd., 1, Wellpark-ter., Bonnybridge. *Warwickshire*: Wilmcote County School, Temp. school buildings, J. R. Deacon, Ltd., Lombard-st., Lichfield, Staffs. *Wilts*: Keevil Airfield, Trowbridge, Alterations, F. H. Biddiscombe, Mill-la., Stallard-st., Trowbridge; Keevil Airfield, Trowbridge, Alterations, E. J. Morgan, Ltd., Hilperton, Trowbridge. *Yorks*: Ripon, Airey houses, Walter G. Birch (Harrogate), Ltd., 33, Springfield-av., Harrogate; County Modern School, South Billingham, School meals accommodation, Thornton Construction Co., Ltd., 30, Bridge-st., Stockton-on-Tees.

London (War Dept.).—Works contracts placed by War Dept. for week ended November 27:—Oxon: Roadwork, Cecil Williamson & Co., Ltd., Beeston, Notts. Northants: Miscellaneous work, Barvis Partners, Ltd., Brentwood, Essex. Essex: Building work, Jas. C. Flaxman Southend-on-Sea. Kent: Building work, Wards Ideal Home and Construction, Ltd., Gillingham. Middx.: Building work, E. J. G. Morgan, Ltd., Uxbridge. London, N.W.: Plumbing work, Smeaton & Sons, Ltd., London, W.C.1. Herefordshire, Tarring work, J. Hood, Caldicot, Mon. Worcs.: Roadwork, Gulistan Road Constructions, Ltd., Leamington Spa, Warwicks. Glam: Building work, William T. Nicholls, Ltd., Gloucester.

Manchester.—Alterations and additions to factory, Buxton-st. and Berry-st., London-rd., for The Hanover Mill Co., Ltd. Pendleton & Dickinson (L.), 16, Brazennose-st.: *David Walton & Co., Ltd., Clarendon-st., Cross-la., Salford 5.

Middlesbrough.—Additions by means of aluminium units at Whinney Banks School, for E.C.: *Bristol Aeroplane Co. (Housing), Ltd., £9,675.

Middlesbrough.—44 houses at Thorntree estate, for T.C.: *Middlesbrough and District Building Trades Association.

Middlesbrough.—Further houses for T.C.: *P. Shannon; *W. Taylor & Son; *J. Oakley (six each); *J. Cresswell; *S. & E. Lowe (eight each). (All of Middlesbrough.)

Middlesbrough.—48 houses in two sections at Thorntree estate, for C.B. J. A. Kenyon, A.M.I.C.E., M.I.Mun.E., A.M.T.P.I., B.E. & S: *Hudson Bros. (Middlesbrough), Ltd., Fidler-st., Middlesbrough, £56,322.

Norfolk.—Conversion of Sidestrand Hall into boarding school for sub-normal children for E.C. F. G. Limmer, County A., County Ed. Office, Stracey-rd., Norwich. *W. Lawrence & Son, Ltd., Swaffham, £27,144.

Northenden.—Additions to factory at Longley-la., for Star Process Engraving Co., Ltd. H. Booker (A.), 28, Kennedy-st., Cooper-st.: *Contractors, Ltd., 4, Clarence-st., Albert-sq., Manchester 2.

Nuneaton.—192 houses at Caldwell estate, for T.C.: *George Cooper & Sons (Nuneaton), Ltd., £42,477 (34); *F. Pallett, £61,002 (48); *Coltman & Sons (Coventry), Ltd., £138,287 (110).

Oldbury.—Dining-room and kitchen at Brandhall school, Brandhall-la., Warley, for E.C. C. B. Eck, A.M.Inst.C.E., B.S., Council House: *Lindley & Siddaway, Dale House, Long-la., Blackheath, Birmingham.

Ripon and Pateley Bridge.—10 houses at Birstwith, for R.D.C.: *W. G. Birch (Harrogate), Ltd., £12,405 (subject to M.H. approval).

Rugby.—Extensions at Railway Wagon Works, for Thomas Hunter, Ltd. R. B. Liddington (L.), 11, Regent-st.: *George Wimpey & Co., Ltd., Tilehouse-la., Denham, Uxbridge, Middx.

Ruthergien.—Additions, etc., at public school. William Watt, architect, Albert-rd., Motherwell: *R. W. Stewart & Co., Ltd., Glasgow.

Skelmersdale.—48 houses at Windrew's Farm, for U.D.C. J. L. Mather, E. & S., Town Hall: *James Gee, 43, Worsley-st., Pemberton, Wigan, £52,468.

Southampton.—Six "Cost of Works" houses at Magnolia-rd., Merry Oak, Bitterne, for C.B. L. Berger, Dip. Arch., A.R.I.B.A., Borough Architect. Quantities by Boro' Architect's Dept.: *H. Lane, £6,673.

Spennymoor.—26 houses and 24 flats at George-st. area, for U.D.C.: *G. M. Pearson, Ltd., Park Estate, Spennymoor, £64,518.

Startforth.—14 houses for R.D.C.: *Boddy & Bell, Thomas-st., Darlington (approved by M.H.).

Stockton-on-Tees.—50 houses, for T.C. A. G. Sinclair, Boro' A., 124, High-st.: *George Fordy & Son, Stockton-on-Tees, £62,895.

Stratford-on-Avon.—20 houses at Clopton estate, for T.C.: *H. Lee Bros., Ltd., Hockley, Birmingham, £27,307.

Stretford.—64 flats, for T.C. A. Cassel & Sons, Ltd., £84,831 (lowest tender referred to M.H.).

Tynemouth.—32 houses at Lynn-rd. estate, for T.C. D. M. O'Herlihy, Boro' E., 19, Howard-st., North Shields: *Urban Development Co., Ltd., Gateshead.

Walsall.—Four police houses, for T.C. M. E. Habershon, B.Sc., M.Inst.C.E., B.E., The Council House: *J. H. Withnall, Ltd., Walsall, £6,000.

West Bromwich.—Additions for classrooms, sanitary conveniences and cloak rooms, Hamstead school, for E.C. H. Schofield, B.Sc., A.M.Inst.C.E., B.E., Town Hall: *A. J. Smith & Co., Ltd., 10, Trinity-st., West Bromwich.

Wolverhampton.—313 houses at Warstones estate, Penn, for T.C. W. Mervyn Law, A.M.Inst.C.E., B.E., Town Hall: *Sir Alfred McAlpine & Son, Ltd., Waterloo-rd. (93); *Molyneux Bros. (Walsall), Ltd., Bath-st., Walsall (50); *T. Wellings & Sons, Ltd., Bradmore, Penn (26); *P. Tonks, Wednesfield (20); *L. Lymer, The Glen, Belt-rd., Hednesford, Cannock (20); *Hough and St. Ledger, Willenhall-rd., New Invention (18); *P. Blundell, Ltd., 183, Windsor-av., Penn (16); *J. H. Vint, Ltd. (12); *L. McLean (12); *J. H. Weller & Co., Ltd., Histon's-hill, Oaken, Codsall (12); *R. Hallett & Sons, Ltd., Manby-st. (10); *Guest & Hand (8); *Bishop, Burns & Co. (8); *E. J. Poole, 380, Prestwood-rd. (4); *A. H. Kibble, 3, St. John's-sq. (4). (Rest of Wolverhampton.)

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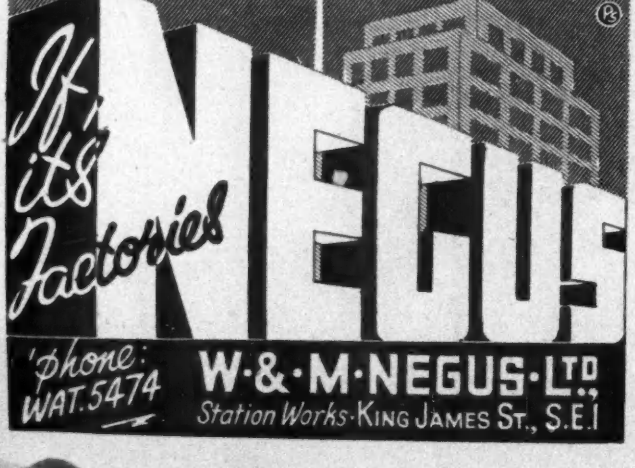

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